

Only Two Packages Gain Datapro Honors

Complete charts of software package ratings begin on Page 43.

By Lois Paul
CW Staff

DELRAN, N.J. — Nineteen software packages made Datapro Research Corp.'s Top Rated Group last year. This year, only two packages received that honor.

Datapro's 1982 "User Ratings of Proprietary Software," based on a survey from which 3,000 responses were tabulated, also revealed that while users are not spending much more for software packages this year than they did last year, 1983 will be a different story. The research firm anticipates that the mean average dollar expenditures for software packages will almost double in 1983.

The two packages named to the Top Rated Group were SAS Institute, Inc.'s SAS



Figure 1: Packages That Have Made the Top Rated Group for Five or More Years

and Syncsort, Inc.'s Syncsort. Both Syncsort and SAS have been in the Top Rated group five or more times (Figure 1).

To make the Top Rated Group, a package must be rated by at least 10 respondents and has to be rated excellent in every category by at least three users.

According to Datapro, although the total dollars spent on software packages

rose a little from 1981 to 1982, the surveyed users spent an average of \$97,673 on software packages in 1981 and an average of \$89,215 in 1982. However, they are expected to spend \$163,281 next year (see Figure 2 on Page 42).

The survey found the majority of respondents (78.5%, or 2,355 users) employ

(Continued on Page 42)

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass. and additional mailing offices © 1982 by CW Communications/Inc.

\$1.50 a copy; \$44/year

October 25, 1982

Vol. XVI, No. 43

Good News From Abroad

By Phil Hirsch

CW Washington Bureau
BOSTON — Europe will spend \$23 billion to improve its telecommunications plants this year, almost as much as AT&T and other U.S. carriers, an Arthur D. Little, Inc. market analysis reported here last week.

The European expenditure is part of a worldwide development that appears likely to benefit all U.S. telecommunications users — even

(Continued on Page 4)

IBM Brings Out Two More 4341s

By Tom Henkel
CW Staff

RYE, N.Y. — IBM last week took the wraps off new high- and low-end machines in its 4341 line of processors. The top-of-the-line model reportedly has 15% more performance than IBM's previous top end in that series, the 4341 Group 2.

At the same time, IBM announced a new release of its Small Systems Executive/Virtual Storage Extended (SSX/VSE) operating system for the 4300 series and a 370-compatible printer.

Other announcements that were made by IBM last week included:

- Price reductions ranging up to 34% on most IBM small and mid-range systems including the 4300, System/23 Datamaster, System/38, 8100 and 5280 processor lines (story on Page 4).

- Enhancements to the 4321 and 4331 line of proces-

sors, including doubled main memory for the 4331 Model Group 11 processor and additional communications options for the entry-level 4321 (story on Page 5).

- A new version of the Real-Time Programming System (RPS), the operating system for the Series/1 line of minicomputers (story on Page 4). RPS Version 6 al-

lows users to link additional Series/1 processors to an existing Series/1 without disrupting system operation.

- Additional communications capabilities for the 8100 Information System that allow direct attachment of an IBM Personal Computer and support application programs developed on a Se-

(Continued on Page 4)

Interviewed on DPMA Floor

Reaganomics? DPers Support It

By Bill Laberis
CW Staff

CHICAGO — They fully expect that many if not most people, including themselves, will suffer because of it. And they do not believe economic recovery is "right around the corner," as the Reagan administration has averred time and time again.

But 17 out of 20 DP managers and conference attendees polled at last week's Data Processing Management Association (DPMA) conference expressed strong support when asked, "What do you think of Reaganomics?"

Two of the remaining three DPers had no opinion. Only one conference attendee, a software distributor, opposed the President's bold economic gamble.

Nearly all those polled said

their operations have been affected, some drastically, by the protracted recession. Reaganomics, the majority felt, is the best way to imbue the economy with a sense of stability, something the

managers said has been negated by rampant inflation.

"We've got several long-term contracts that have taken a beating due to inflation," said John O'Malley,

(Continued on Page 8)

Influx of Corporate Micros Described as Mixed Bag

By Catherine Marengi
CW Staff

PALM SPRINGS, Calif. — Personal computers in large, mainframe-based corporations are a mixed bag: "For vendors, I see them as an opportunity. For users, they are a source of both excitement and frustration," said P. Michael Seashols, marketing vice-president for Dynabyte Business Computers, Inc.,

based in Milpitas, Calif.

Chairing a user panel at International Data Corp.'s Fall Executive Conference on "Distributed Resource Systems" here last week, Seashols voiced the management information systems (MIS) person's concern at feeling "out of control" in defining his own and his company's destiny.

(Continued on Page 12)

SPECIAL REPORT

Inside —
DBMS: Opening Doors
To New Opportunities



COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. Computerworld (ISSN: 0010-4841) is published weekly, except March (7 issues), June (5 issues), September (6 issues), November (6 issues), December (4 issues) and a single combined issue for the last week in December and the first week in January by CW Communications, Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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Special requests should be addressed to Nancy M. Shannon, CW Communications/Inc. Box 880, 375 Cochituate Rd., Framingham, MA 01701. ISSN 0010-4841/82 \$3.00 + \$0.50.

\$1.50 a copy. U.S. — \$44 a year; Canada, Central & So. America — \$110 a year; Europe — \$165 a year; all other countries — \$245 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

ABC, ABP, MCC, MEDIA DATA POND

Says It Never Got Workable System User Sues Qantel, Local Distributor

By Jeffry Beeler

CW West Coast Bureau

LOS ANGELES — A user of Qantel Corp. small business systems has sued the vendor and its local distributor for allegedly breaching a contract with the customer and "intentionally misrepresenting" the capabilities of their products and services.

The suit, which demands more than \$1.2 million in total damages, accuses Qantel's exclusive area distributor — Metro-Comp, Inc. — of renegeing on its agreement to provide the user with a workable order tracking and accounting system.

Metro-Comp began delivering the system to Calox, Inc. in late 1978, but thereafter proved unable to debug the accompanying application programs and make them operational, Calox alleged in its complaint. Failure of the system to work according to specification seriously hindered the user's efforts to collect its accounts receivable and eventually deprived the medical equipment supplier of almost \$70,000 in revenues, the suit said.

Asked to comment on the complaint, Metro-Comp President Allen Weiss acknowledged the existence of some serious problems at Calox, but defended his company's overall success rate. "We have many hundreds of customers, and when you have that many users, you will always have a few who will have a difference of opinion with you about the products and services they buy," Weiss said.

Weiss' firm is Qantel's exclusive distributor in both Los Angeles and Ventura counties. By combining its own custom-written software with Qantel's hardware, Metro-Comp pro-

duces "turnkey" small business systems, which the firm then sells mainly to first-time users like Calox.

A little more than four years ago, Calox signed a contract for a Metro-Comp-supplied system built around a Qantel Model 1400 processor and two sets of interrelated application software tailor-made to the user's specifications. One set consists of general accounting programs for payroll processing, personnel inquiries and general ledger.

The other set of application software forms a "custom sales order tracking and distribution system" and includes modules for items like order processing, billing, accounts receivable and inventory control.

Calox's agreement with Metro-Comp called upon the distributor to assume full responsibility for developing and installing the custom software, providing postinstallation support and training the user's employees to operate the system, the suit alleges.

Installation of Calox's system began during the fall of 1978. But since then, "all we've been able to get out of [our software] is one big fat zero,"

Calox's controller and vice-president of finance, G.C. McAfee, said.

The single most critical element of the user's small business system is its billing program, which forms the foundation upon which all the rest of Calox's application software modules depend. But even after four years of strenuous effort by both vendor and customer alike, the suit contends, Metro-Comp has never been able to get the billing system up and running.

During the course of the unsuccessful installation, McAfee met several times with his Metro-Comp counterparts in an attempt to secure increased support, but the discussions eventually proved to be of no avail.

Metro-Comp finally abandoned its effort to supply Calox with a custom-written billing system and tried instead to install a modified version of a software package originally developed for another user. But while the replacement was being implemented, all the data from Calox's original billing program was irretrievably lost, McAfee said. The data reportedly had taken the user several months to load.

Corrections

In the July 19 Product Spotlight on voice/data private automatic branch exchanges (PABX), the chart at the top of Page 12 indicated that Hitachi America Ltd.'s Management Information Network PABX offers 100 to 256 switch ports. The system provides up to 5,000 switch ports.

In the Product Spotlight focusing on desktop computers [CW, Oct. 11], the article neglected to mention that

only 16-bit-based microcomputers would be highlighted in the charts on Pages 14 through 16. In addition, in the chart at the top of Page 15, Hewlett-Packard Co. was incorrectly listed at the top of the column headed by Dynalogic Infotech.

Finally, the price of Tandy Corp.'s TRS-80/16 computer system was incorrectly inflated by about 30%. The actual price of the system is \$4,999.

This Week

SPECIAL REPORT

Data Base Management Systems Follows ID/16

IN DEPTH

Commonsense Systems Analysis Follows Page 60

NEWS

IBM Updates Series/1 Operating System 4
 IBM 8100 Gains Link to Micros, Small Systems 5
 Bankruptcy Blamed on 13-Year Fraud via DP 6
 Burroughs Chairman Details Info Age Changes 8
 DPMA Award Winner Warns Against Isolation 9
 Fashion Coordinator: Dress for DP Success 10
 Data Design Key to Systems: IBM Consultant 11
 Corporate Users Cite Gains From Micro Shift 13
 'Sun Setting on DDP,' Researcher Maintains 14
 Budget Cuts FBI Trainer's Biggest Problem 15
 Reform '88 Draws Wide-Ranging Responses 17
 No Application Generators Exist, Exec Contends 20
 Resisting Nonprocedural Tools Seen as Threat 21
 Futurist Sees Programmers Out in Cold by '90s 22
 Users Warned of Risks in Setting Up Info System 23
 RDC Exec Explains Decision Support Center 26
 Best DSS Save Managers' Time: Exec 30
 Study Sees Better Time Use With Mail 31
 Consultant Details 'Five Ws' of Needs Analysis 32
 Expert Claims Staff Overlooked in OA Moves 33
 Info Center Concept Seen Growing 35
 Managers on the Move 36
 Turnaround Time 37

EDITORIAL

Editorial: Make Room at the Top 46
 Softline: Providing Best Implementation Setting 47
 Reader Commentary: A Halloween Tale 47
 Human Connection: Searching for DPs 48

SOFTWARE & SERVICES

Manufacturing System Unveiled by MSA 53
 Data Encryption Tool Out for 370 Users 56
 'Natural' Version 1.2 Gets Full Screen Editor 57
 Software Products Unveiled at Info 58
 'System/Manager' Gets On-Line Display Capability 59
 Xerox Division Restructuring Prices 60

COMMUNICATIONS

FCC to Restructure Wats Rates 61

SYSTEMS & PERIPHERALS

Disk Drive Supply Up, Prices to Stabilize 69
 Chromatics Offers Five Options for CGC 7900 70
 Standard Interface Announced 71
 IBM Disk Drive Predicted Out by Year's End 72

MINIWORLD

Multuser Desktop Unit Boasts Dedicated CPUs 75
 Interface for IBM Micro Controls Video Playback 78
 Micro With Sealed Enclosures Bows 82

OFFICE AUTOMATION

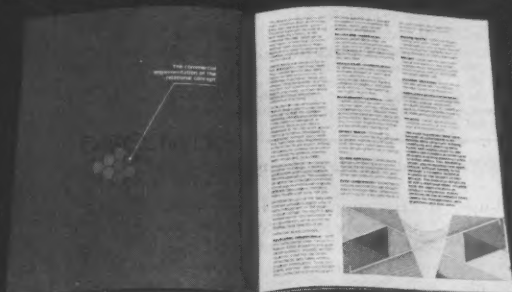
Workstation Installation Said to Cause Headaches 83
 IRM DBMS Out for IBM Mainframes 84

COMPUTER INDUSTRY

Renier Easing Into Top Info Systems Spot 85
 Micro Cents, Mainframe Dollars: Gap Narrows 85
 Silicon Valley Dealers Arrested in 'Sting' 86
 Expert Warns of Pitfalls in Becoming Franchisee 89
 DP Litigation Said to Reflect Industry Changes 90
 Reports Examine Equipment Maintenance 97

ADVERTISING INDEX 126

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IBM Extends 4341 Family

(Continued from Page 1)

ries/1 or 5280 distributed data system (story on Page 5).

• An impact printer, the 3262 Model 5, which prints up to 650 line/min and attaches to either byte or block multiplexer channels on a variety of IBM systems.

New 4341 Processors

The two new 4341 machines are the high-end Model Group 12 and the low-end Model Group 9. The Model Group 12, which is available with 2M to 16M bytes of main memory, comes with six standard channels and offers about 15% more performance than the previous top-of-the-line 4341 processor, the 4341 Model Group 2, IBM said.

Existing Model Group 2 users can field-upgrade to the Model Group 12, according to IBM.

The Model Group 9 is available with 1M, 2M or 4M bytes of main memory. It reportedly offers about 70% of the performance of a 4341 Model Group 10 processor and is available with three standard channels and three optional I/O channels.

Prices Go Down, Prices Go Up

RYE, N.Y. — IBM last week lowered purchase prices up to 34% on four lines of its small and mid-range processors. The price decreases are effective immediately.

The company also announced a 9% increase in the lease and rental prices of the 5280 and assorted peripherals. The increases will be effective Feb. 1.

Processors affected by the price decreases include the 4300 line (which were decreased from 8% to 34%), System/38 (decreased from 10% to 25%), System/23 Datamaster (down 12% to 24%), 8100 series processors (decreased up to 27%) and the 5280 Distributed Data Systems (decreased up to 26%).

IBM announced similar price cuts on selected peripherals — mainly printers, disk and tape units — which are used with those systems.

Examples of the price cuts include:

- A 4341 Model Group 10 processor with 4M bytes of main memory that formerly cost \$209,400, now costs \$170,000, a reduction of 19%.

- An 8140 processor with 786K bytes of memory, formerly priced at \$68,440, now costs \$64,610.

Rental and lease prices were increased about 9% on the 5280 and selected printers and 12% on IBM 3370 and disk drives. Under the restructured prices, a 3370 Model BL1 that formerly leased for \$831/mo on a three-year agreement will cost \$933 on Feb. 1; a 3375 Model BO1, which now costs \$831/mo on a three-year agreement, will cost \$997/mo on the same date.

Printers affected by the higher lease and rental schedule include the 3262, 5222, 5225 and 5226. The 5225, for example, currently leases for \$396/mo on a three-year plan but will cost \$436/mo Feb. 1.

System	4341-9	4341-10	4341-11	4341-12	4341-2	4341-12
Characteristics						
Relative Performance ¹	24	34	40	50	66	76
Mips ²	.40	.58	.72	.88	1.1	1.2
Memory Size in Bytes (Minimum-Maximum)	1M-4M	2M-4M	2M-4M	2M-8M	2M-16M	2M-16M
Purchase Price ³ (Memory Size)	\$81,000 (1M)	\$170,000 (4M)	\$225,000 (4M)	\$240,000 (2M)	\$350,000 (4M)	\$500,000 (16M)
Lease Price (Lease Term)	\$5,400 (2 Year)	\$8,235 (2 Year)	\$9,230 (2 Year)	\$10,340 (2 Year)	\$13,420 (2 Year)	\$21,650 (2 Year)
Machine Cycle Time (Nsec)	150-300	150-300	150-300	120-240	120-240	115-230
Channels (Minimum-Maximum)	3-6	3-6	3-6	6	6	6
Cache (Buffer) Size	2K	4K	8K	8K	16K	16K
Bus Architecture?	No	No	No	No	No	No
Price per 1M Byte Of Main Memory	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000

1. CW estimates based on vendor-supplied information. Relative performance ratings are based on an IBM 370/158-3 equating 45. These numbers are designed to put the processor into perspective with other systems; they do not constitute a buyer's guide. All sys-

tems are not alike; they use different operating systems, instruction sets and architectures and therefore cannot be directly compared. In addition, actual relative performance may vary with the application, peripherals and software.

2. CW estimates.
3. For the processor only.

CW Chart

IBM's newest additions begin and end the 4341 line.

The Model Group 9 can be field-upgraded to the larger Model Group 10 processors, according to an IBM spokesman.

The Model Group 12 will be available in February and the Model Group 9 in March. A 1M-byte Model Group 9 processor costs \$81,000; a 16M-byte Model Group 12 costs \$500,000.

The new release of SSX/VSE is said

to offer support for 4341 processors; it previously supported the 4321 and 4331 processors. In addition, the operating system now supports IBM's 3601, 3602 and 4701 Finance Communications System controllers, the IBM spokesman said.

Release 2 of SSX/VSE also offers enhanced network management capabilities and support for IBM's Structured Query Language/Data System

data base management system, IBM noted.

The 3262 Model 5 printer announced by IBM last week can be linked to most IBM 370-era processors. The unit attaches to either a byte or block multiplexer channel and can print 252 to 650 line/min, IBM said.

The printer costs \$17,000 and leases for \$1,700/year on a two-year plan.

Beefs Up Multiprocessing Capabilities

IBM Updates Series/1 Operating System

RYE, N.Y. — IBM beefed up the multiprocessing capabilities of its Series/1 minicomputers last week with a new release of the Real-Time Programming System (RPS) operating system. RPS Version 6 allows users to add Series/1 processors to their systems without disrupting operation, IBM claimed.

The vendor also announced a multiprocessing feature, available under Version 6, that allows up to 16 Series/1 processors to operate as a unified system.

One highlight of RPS Version 6, which is available for both single- and multiple-processor configurations, is a "duplex" feature that allows users to make redundant copies of data files. Two or more disk drives must be attached to the Series/1 processor to use the feature.

In a multiprocessor environment, the redundant disks can be attached to separate processors. In the event of a primary disk failure, RPS Version 6 automatically switches to the backup disk. The switch-over is transparent to both the application and end users, IBM said.

RPS Version 6 also includes a redesigned I/O architecture that reportedly improves Series/1 response time and throughput. In addition, the new I/O architecture supports more terminals and storage devices.

A Command Language Facility, which was formerly an IBM Program Product, is included in Version 6. The facility makes the system easier to use by providing full-screen menus, which allow users to access functions and applications more easily, IBM said.

Other former Program Products bundled into Version 6 include Systems Network Architecture extended support and magnetic tape support, IBM said.

With the separately purchasable

multiprocessing feature announced by IBM last week, two to 16 Series/1s spaced up to 5,000 feet apart can be linked together. The total configuration appears as a single system to an operator.

The full system can be controlled by a single console operator who can configure the system, indicate which files are to be "duplexed" and manage work load distribution, IBM noted.

The multiprocessing feature provides for modular, nondisruptive growth, which allows additional processors to be attached without shutting down the system, the vendor added.

The multiprocessing feature provides a two-channel switch support

that allows critical devices to be switched from a failing system to a working system to maintain system operation. Once the device or inoperable system is repaired, it can be restarted without having to stop the entire system, IBM said.

The Series/1 processors are connected by a 2M-bit Local Communications Controller. The ring, or cable connection, consists of two parallel rings that provide communications redundancy, IBM said.

A one-time license fee for RPS Version 6 costs \$6,500. The one-time license fee for RPS Version 6 with the multiprocessing feature is \$9,750. Multiprocessing Version 6 is available for \$445 on a monthly license agreement.

European Plans to Benefit U.S.

(Continued from Page 1)

those who communicate only within this country, according to Edgar A. Grabhorn, director of ADL's world telecommunications information program. Grabhorn spoke at an international telecommunications seminar held here last week by ADL.

In the UK, the first link in a projected 100,000-kilometer fiber-optic communications network was installed this year; by 1985, digital switches are scheduled to be serving the country's 30 largest cities. In Japan, Grabhorn said, low-cost facsimile service to business and residential users has been offered since 1981; teletext service will begin next year.

In Canada, France and West Germany, large investments in telecommunications are producing significant improvements in capabilities, Grabhorn noted.

These investments will improve the international communications services available to U.S. firms that operate abroad — particularly since de-

veloping as well as developed countries are improving their telecommunications infrastructures, Grabhorn said. He pointed out that India has contracted with a French manufacturer for time-division telephone-switching equipment and is installing "dozens of earth stations"; Thailand has received a loan to improve its telephone network and install a domestic satellite network; Brazil and Mexico have each signed contracts for satellite networks; New Zealand is installing fiber-optic telephone cables; and Egypt has bought electronic switching systems from AT&T.

Some countries investing heavily in telecommunications hope to market their technology in the U.S., a number of speakers at the ADL conference noted. Arthur H. Solomon, manager of ADL's telecommunications section, said that South Korea, Taiwan, Singapore and Hong Kong may soon be offering "effective competition" in export markets.

New Discount Plan Unveiled

IBM 8100 Gains Link to Micros, Small Systems

By Tom Henkel
CW Staff

RYE, N.Y. — Users of IBM's 8100 Information System can now attach IBM Personal Computers and other IBM small systems directly to their processors, the vendor announced last week. IBM also unveiled a more attractive volume discount plan for its 8100 systems line.

IBM's Personal Computer can be attached to an 8100 under the firm's Distributed Processing Programming Executive (DPPX) either through a Synchronous Data Link Control (SDLC) communications adapter or through the newly announced Model 7426 terminal interface unit.

The 7426 is available in two models. The Model 1, which costs \$4,210, is for direct or data link attached loops. The Model 2, which costs \$3,830, was designed to be connected via an SDLC communications link. Previously,

the 7426 was available only as a Request for Price Quotation item, IBM noted.

Users of the Personal Computer, 5280, Series/1 and Displaywriter word processor can also access a remote 8100 via dial-up switched communications lines. This can be accomplished only if those devices are in a Systems Network Architecture environment under 3270 emulation. The switched lines communications, IBM said, are less expensive than using leased lines.

The 8100 Information System has been enhanced to allow user-written applications from the Series/1 minicomputer and 5280 distributed data

system to communicate with applications on an 8100. The feature is available under the DPPX operating system.

The Series/1 or 5280 applications can also communicate via the 8100's "data stream-compatibility pass through" feature with applications stored in a 370, 30 series or 4300 series processor. This, according to IBM, allows users to write programs and transfer files more easily through systems.

However, Series/1 and 5280 users can still communicate with an 8100 processor via a 3270 emulation feature announced by IBM last July.

Finally, IBM announced an en-

hanced Installation Productivity Option (IPO) Release 5. Used with DPPX, the IPO provides additional support for device customization, problem determination and application development, an IBM spokesman said.

IBM also revised the volume purchase discount plan for 8100 series processors. The new discounts go up to 25% for purchases of 20 or more processors or controllers. The previous maximum was 9% for 10 or more systems or controllers.

In a related move, IBM announced a volume discount ceiling of up to 15% for the 8775 display terminal. That unit formerly had a 9% ceiling.

IBM Adds Capabilities To 4321, 4331

RYE, N.Y. — In addition to announcing two new models of its 4341 line of processors, IBM also announced added capabilities for its 4321 and 4331 processor groups.

For the smallest 4300 processor offered by IBM, the preconfigured 4321, the vendor announced communications enhancements previously available only on the 4331 processors. Users of the preconfigured 4321 can now use one byte and one block multiplexer channels with their processors. There is no charge for this capability, IBM said.

Furthermore, 4321 users now can use IBM 3370 and 3340 disk drives in addition to 3310 drives.

In addition, the 4321 now supports up to eight Systems Data Link Control (SDLC), binary synchronous or start/stop lines, IBM said.

The 4331 Model Group 11 processor was enhanced to support twice as much main memory as it formerly did. The processor can now accommodate up to 4M bytes of main memory. Upgrading from 2M bytes to 4M bytes costs \$20,000. The purchase price of a 4M-byte 4331 Model Group 11 is \$112,420.

In addition, like the 4321, the Model Group 11's communications adapter base has been expanded to support up to eight SDLC, binary synchronous or start/stop lines. Previously, three SDLC or binary synchronous lines were standard and five additional lines were optional.

IBM also announced a no-charge feature that allows users of Fixed Block Architecture disk drives — the 3310 and 3370 — to emulate count key data formats offered on larger disk drives, such as the 3375. This, according to IBM, gives 4331 Model Group 11 users the option of attaching 2310 series, 3330 and 3340 formats.

The 4321 and 4331 enhancements will be available in February, IBM said.

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Bankruptcy Blamed on 13-Year Fraud via DP

By Marguerite Zientara
CW Staff

MIAMI — Falsification of financial data and computer-aided inflation of parts inventories over the last 13 years contributed to the downfall of the photocopier group of Saxon Industries, Inc. here, according to a bankruptcy court report.

A Fortune 500 company that reported a net profit of \$7.1 million in 1979 and \$5.3 million in 1980, Saxon filed for bankruptcy last April.

Calling the events at Saxon's Business Products (SBP) Division a "tragedy," court-appointed examiner Arthur J. England Jr., a former chief justice of the Florida Supreme Court, cited the "audacity and magnitude of the fraud" uncovered in the course of his investigation.

In his preliminary report for the U.S. Bankruptcy Court of the Southern District of New York, where Saxon is headquartered, England described the extent of SBP's deception. One manufacturing parts inventory sheet for last year, for example, showed 89.8 million total parts, but by the time the management information systems (MIS) department reportedly got done massaging the data, the same report listed 182.6 million parts, England found.

Furthermore, last year's inventory was valued by the company at \$120.6 million, a figure \$67 million beyond reality, according to England.

How did SBP actually perpetrate its alleged inventory and financial data

fraud scheme?

Inventory inflation began with a physical count of all manufacturing parts in stock, resulting in inventory "tags" to be counted. From tag control, inventory tags were sent to the MIS department for input to the computer, England's report explained.

The tags would be keypunched and daily reports sent back to tag control for corrections. After corrections were made, a report reflecting all parts comprising the manufacturing parts inventory — including tag numbers, quantities and part locations, but excluding prices — would be sent to the finance group.

"All validity to the year-end inventory process at SBP ended with the production of the unpriced tag run," England found, "for another report of manufacturing parts inventory was to be developed from the MIS department."

Phantom Report

The second report — "never seen by manufacturing and operations personnel" — and whose distribution was "closely guarded by the finance group" was a priced tag run that "supposedly reflected the total dollar value of the manufacturing parts inventory," according to the report.

In reality, however, the priced tag list contained many inventory tag numbers and related part quantities not included on the unpriced run.

How Could It Go On So Long?

MIAMI — How did the alleged massive fraud scheme at Saxon Industries, Inc.'s Business Products Division manage to go on for 13 years without detection?

The biggest reason lies in former President and Chief Executive Officer Stanley Lurie's total control over the division and his lack of responsiveness to requests for information from the board of directors, according to bankruptcy court examiner Arthur J. England Jr.

Lurie's methods of covering up

were varied, England said in his preliminary report for the U.S. Bankruptcy Court of the Southern District of New York. "Finalized agendas were not prepared until the last minute, so there were no premeeting distributions of financial materials to the board," England's report explained. "Materials submitted came so late and in such volume that board members could not read the materials prior to taking action ... Information requested or promised was simply never delivered."

"These additional items of inventory [were] fictitious," the report said.

Not only were there phantom items, but in some cases there were phantom warehouse locations. For example, according to the report, "The 1981 priced inventory run ... shows parts being stored in the non-existent Building Three warehouse location." The warehouse area of Building Three had been eliminated in 1977.

MIS personnel reportedly sometimes were asked to run the same report as many as six times with different factors so that corporate management could then choose the version that best suited its purposes.

As another part of the "year-end process," the computerized general

ledger was falsified to show "diminished expenses, inflated sales and inflated profits," according to England. "Much of the work was done at night and on weekends, presumably so others at SBP could not observe the amount of activity."

There were so many different general ledger tapes, in fact, that MIS personnel reportedly created fictitious dates such as Dec. 32 and Dec. 33 just to keep track of them. When one tape was finally chosen as the official version, it was dated Dec. 31 and submitted.

Some computer technicians and finance workers who participated in the alleged fraud were reportedly given bonuses of \$2,000 or more, according to England's report.

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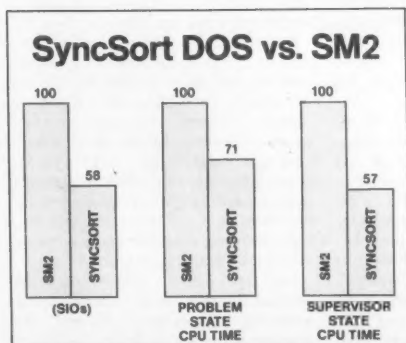
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The Mood: Lively, Upbeat

CHICAGO — Despite the current recessionary times, the mood was lively and upbeat when a record number of attendees converged in the Windy City last week for the Data Processing Management Association's (DPMA) conference and exposition.

Describing the theme of the conference — "Managing for Success: Stay on Top of Tomorrow" — one DPMA official told the overflowing crowd attending the opening ceremony, "When the wind shaft hits the work place, some people will be wearing parachutes and others will be carrying pianos."

The conference's keynote address, delivered by Burroughs Corp. Chairman W. Michael Blumenthal, was well received. The educational portion of the conference — general sessions covering such "hot-button" managerial issues as stress management, effective communications and team building — was attended by about 800 information professionals.

The conference exposition saw a 26% gain in traffic compared with last year. Nearly 3,000 people strolled through the 165 exhibits during the first two days of the conference.

Although many attendees said they were dividing their time about equally between technically oriented and management-directed sessions, the latter were extremely well attended.

Burroughs Chairman Details Information Age Changes

By Marcia Blumenthal
CW Staff

CHICAGO — The Information Age is not only changing the fabric of society, it is also altering the way people manage computers within an organization.

This was the theme W. Michael Blumenthal, chairman of Burroughs Corp., offered at the opening of the Data Processing Management Association's conference here last week.

Blumenthal, whose experience has spanned college teaching, high-level government service and the direction of private businesses, told the overflow crowd that "the Information Age means the presence of intelligence other than our own. Never before have human intelligence processes been so faithfully replicated so accurately."

That, he said, must be the meaning behind an MIT professor's statement that being able to program a computer gives an enormous sense of power to the programmer.

That power is being transferred to a whole new generation now growing up with unprecedented skills in information manipulation, Blumenthal said in his keynote address. This computer-literate generation is "part of a revolutionary vanguard foreshadowing a startling social change," he stressed.

At the same time that computers are influencing the quality of life, infor-

mation systems professionals are discovering that the technology is exerting a powerful change in managing

CW At DPMA

corporate data systems. Technology is changing the way information is assimilated within the organization.

The technology of integrated office systems is very different from traditional DP systems, Blumenthal observed. The nature of data is much more diverse, encompassing structured, unstructured and semistructured data. And the vast majority of users do not have much technical training.

In addition, the technology itself is different. Office automation is an emerging technology while traditional DP technology is stable and mature.

But perhaps the most important change is in the goals of information processing. Traditional systems automated standard operating processes, with efficiency and serviceability being the ultimate goals. Now, because of the strategic position of informa-



CW Photo by B. Labaris

"The Information Age means the presence of intelligence other than our own," Burroughs Corp. Chairman W. Michael Blumenthal told the DPMA last week.

tion systems in the organization, adaptability and effectiveness are emerging goals, Blumenthal said.

These goals are in turn changing the role of information systems managers. They are becoming generalists and must understand people's reactions to computers within the organization. As part of their jobs, these managers must comprehend the way systems are evolving and anticipate the future needs of such systems.

Moreover, the role of computer professionals is becoming less centralized — stressing the coordination of corporate data bases, interacting with users to discern their processing needs and serving both line managers as well as senior executives.

DPers Back Reaganomics

(Continued from Page 1)

president of Datashield, Inc. of Milwaukee, a computer services company. His company "has been hurt financially by Reaganomics ... although not as much as it would have been in the long run without the inflationary control Reagan has brought about."

O'Malley would like to see a 10% across-the-board cut in employment in all departments of the federal government.

"Reagan's done more in two years than other guys did in a full term," he added.

Sam Luke, president of VIP Underwriters Co. of Hawaii, said Reaganomics deserves a chance to succeed or fail on its own merits, something he claims Congress is reluctant to let happen.

Luke assailed the "giveaways" allowed by previous administrations: "It's time for all of us to suck in our gut a little and take a few lumps."

Luke admitted he's becoming "a bit more reticent" about giving wholehearted support to Reaganomics because "the economy is beginning to affect my business pretty seriously."

Two DPers sharing a drink with Luke also shared his opinions of Reaganomics. Robert Finke, systems manager at Cummins Systems Corp. of Columbus, Ind., said he's experienced the ravages of the recession "up-close and personal."

Cummins, a \$2 billion diesel engine manufacturer, is currently operating at about 50% capacity and has laid off about 5,000 workers internationally, Finke said. Exempt management employees are facing wage freezes, with some having to accept wage cuts.

"There's a noticeable uneasiness in the work force, but I'm willing to see

what will happen with Reagan's plan of attack," he said. "He [Reagan] can't right 30 years of wrongs in two years. Maybe we were a bit too optimistic at first. Maybe that was the President's fault."

"But we've got to stop thinking of ourselves as Democrats or Republicans and start calling ourselves Americans and get this show on the road."

Seated next to Finke, Ed Aubin, president of Aubin Associates of Dublin, Calif., echoed similar sentiments. Reaganomics, he said, "had to happen." He concurred with Luke that Congress should show greater support for the program.

Wallace Baxter, senior systems analyst at USM Corp., Beverly, Mass., said the recession forced him to pay his way to the DPMA meet this year.

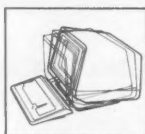
Baxter argued that the country needs "a return to the work ethic" and that Reaganomics is part of the shock treatment needed to get the nation back on this track. Too many workers, he said, "have come to feel they're doing their company a big favor just by coming to work."

And two woman DPers, who described themselves as "liberal, hard-working Democrats," agreed the country should stay the course, as the Republican leadership has maintained.

Patti Schmidt, operations director, and Laurie Arles, marketing director, both of Datashield, said winning the battle against inflation and onerous interest rates is an indication that Reaganomics deserves a chance to work.

The economic program, Schmidt said, "gave us a shot in the arm. It's taught us all a little something about tightening our belts."

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DPMA Award Winner Geckle Warns Against Further Isolation From Business

By Bill Laberis
CW Staff

CHICAGO — Throughout his 30-year evolution as a recognized species, the DP manager has had an opportunity to become a complete master of computing resources within his company.

This evolution has, in some ways, been self-defeating because DPs have tended to isolate themselves from the general business environment.

"There's a good possibility the information manager of the 1970s is going to feel very protective of his turf now that it's time to share his information throughout the company. If he's not very careful, he will further isolate himself from the general business environment and miss another great opportunity in the next generation of computing development," said Jerome W. Geckle, president and chief executive officer of the PHH Group, Inc.

Thus, according to Geckle, DP managers who fail to learn from history are doomed to repeat the mistakes of the past, ending up alienated from the business mainstream.

Geckle received the Data Processing Management Association's Distinguished Information Sciences Award at the association's annual conference here last week. The Baltimore native was cited as being one of the first and most successful managers to bridge the gap between data processing and top corporate management.

Worst Enemies

DP managers have historically been their own worst enemies in bridging that gap, thereby depriving themselves of movement up the corporate ladder, Geckle said in an interview before the award presentation.

"Results are the only thing the world is truly interested in," he remarked. "Yet we in data processing tend to get caught up in the technology without focusing on the fact that the technology has to have an application to a particular problem. The computer room becomes a little enclave. We forget why we're there in the first place and that's to provide resources for the person with a business problem."

Drawing upon a DP experience that predates the IBM 650, Geckle mapped out the differences and similarities between the DP manager of today and his counterpart of 30 years ago. DP really did not exist in the early 1950s, he said. Rather, companies opened "IBM shops" to perform machine accounting applications, usually under the auspices of the controller or finance department.

Product control, manufacturing analysis and marketing strategies were only whims in the minds of futurists.

As a new DP'er at the PHH Group in Baltimore, Geckle said he recognized the need to switch the focus of the DP department to the user community, a need at which many DPers balked.

"Information processing people have been caught up in trying to master the technology for as long as I

can remember, sometimes thinking of the company's needs only as an afterthought," Geckle said. "Perhaps

CW At DPMA

it's human nature, but it hasn't done the managers a whole lot of good."

The 1960s brought the development of Cobol which, Geckle said, was a critical factor in bridging the DP-corporate management gap. The business language, he said, made it possible for DPs to relate to busi-

ness needs and, therefore, to corporate management, in a completely new and challenging way.

Still, it was a frustrating time for many DP managers, who still had to report directly to the finance department. Thus, applications development may not have proceeded as fast as it may otherwise have, he noted.

"But Cobol raised the ideals and rights of system people," he said. "It made many of them get involved in the entire business. And that is the single greatest challenge facing the information manager today — to know his company's business intimately so he can best direct the DP resources to produce good results."



'We in data processing tend to get caught up in the technology without focusing on the fact that the technology has to have an application to a particular problem,' Jerome Geckle warned last week.

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Fashion Coordinator Tells How to Dress for DP Success

By Bill Laberis
CW Staff

CHICAGO — You have to look like you mean business if you are a DPer serious about interfacing more with the board room than the computer room.

To climb the ladder of management success, "you have to show people by the way you dress that you are someone who cares about who you are and what you do," Nena Ivons, fashion coordinator at Sak's Fifth Avenue, Inc., claimed. "You have to project confidence, and you can't do that if you're not dressed properly."

When Ivons spoke at the Data Processing Management Association conference here last week, more than 200 DP managers, mostly men, listened intently. And they sat bolt upright when Ivons pointed out the importance of good posture, tugged at their shirt sleeves when she told them just how much sleeve should peek out from a suit jacket and shuffled their feet when she warned them of the professional hazards of wearing open-toed shoes.

Most of the audience seemed in need of an upgrade in personal appearance, at least according to the rules set forth during the 90-minute fashion show hosted by Ivons. The DPer attending the session sported the user-friendly look for the most part, and this simply will not do for the board room and executive round table, Ivons said.

Ivons' three models, two women and a much younger looking man, displayed the look that made the likes of Brooks Brothers famous. Pin stripes, gray flannel, basic black and even more basic pumps. There is no place for toes in the executive suite.

Indeed, how one wears the executive uniform is equally as important as what you wear, Ivons explained. Despite a \$400 suit and \$50 silk tie, total clothing degradation can result if the sloppy DPer fails to press his pants or her skirt. And, as in the manufacture of fault-free chips, overall cleanliness and grooming is next to godliness and no less vital in getting to the top, she said.

For upward-thinking DP managers who are contemplating upgrading their wardrobe into the executive style of the '80s, Ivons recommended the following program of dos and don'ts:

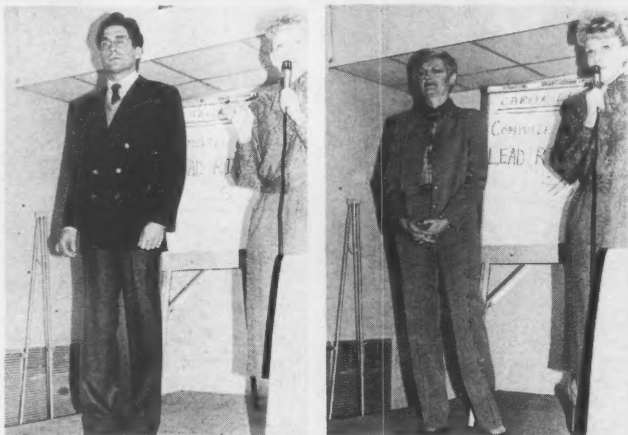
- For women, keep the color off your legs until after five o'clock. Wearing red or green or textured nylons to the executive suite is not as professionally flattering as the natural color of your birthday suit.
- Keep the hemline at that classic length — just below the kneecaps. Skirt pockets provide random access for your hands when you're standing up and talking.
- If you feel the need to wear pants to work, do so only as part of a suit. Never — under the threat of throwing your success climb into the interrupt mode — take off the jacket component of a pants suit.
- Make certain a suit's shoulders and sleeves (I/O ports) fit properly, both sitting and standing.
- For men, the soft wear look of tasseled loafers and moccasins is OK,

although those wishing the more traditional architecture of black wing tips can get by with the old standbys.

CW At DPMA

• Bad news for contact lens wearers: People have more confidence in those who wear glasses. So if you have glasses, wear them.

• In adding peripherals to your wardrobe, try to integrate purchases into new configurations with the clothes you already have.



CW Photos by B. Laberis

He displays the look that made the likes of Brooks Brothers famous; she wears pants to work only as part of a suit, cautioned Nena Ivons.

"What can Lanier show me in distributed processing systems?"

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"What is Lanier's system architecture?"

"Lanier's system architecture is structured in layers with defined interfaces between layers. This is similar to modern network architecture, in particular SNA. Logical addressing provides connections to the physical links for all the devices and processes in the system. This even applies to the smallest system. Thus, modifications or extensions to the configuration may be made without affecting the end user."

"Can Lanier's distributed architecture keep up with my company's changing needs?"

"Certainly. Lanier's layered architecture makes it easy to upgrade the processor, the controller hardware, and the file system. All such improvements are transparent to the user

community, except for increased performance and functions. The advantage of the architecture is that systems are easy to modify as new requirements evolve."

"But haven't these types of architectures been around for years?"

"Yes, many of today's most effective system designs use them. However, an important difference in our philosophy is our adherence to an open system interconnection concept. Although primary emphasis is on SNA, future plans include other de facto standards as they evolve."

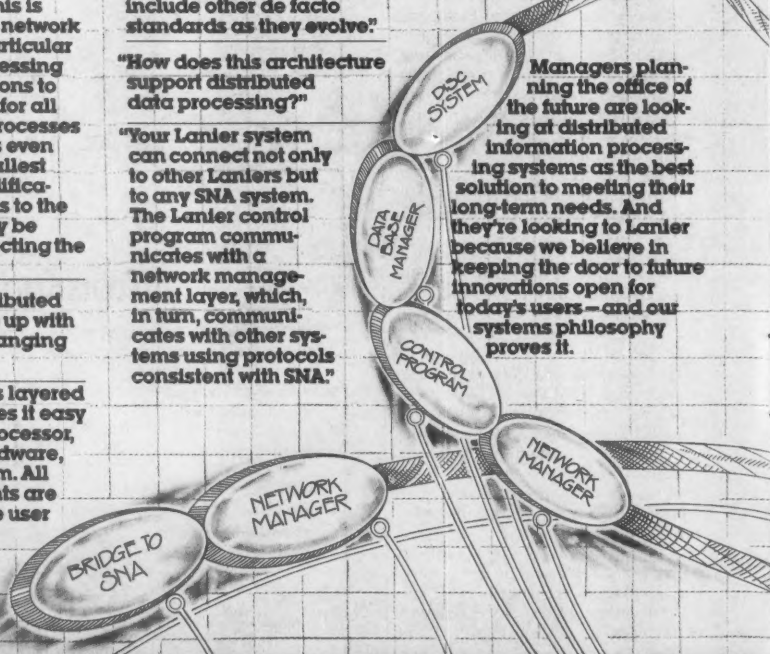
"How does this architecture support distributed data processing?"

"Your Lanier system can connect not only to other Laniers but to any SNA system. The Lanier control program communicates with a network management layer, which, in turn, communicates with other systems using protocols consistent with SNA."

"But what about communicating with systems that don't use SNA?"

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Managers planning the office of the future are looking at distributed information processing systems as the best solution to meeting their long-term needs. And they're looking to Lanier because we believe in keeping the door to future innovations open for today's users — and our systems philosophy proves it.



Data Design Key to Systems: IBM Consultant

By Catherine Marengi
CW Staff

PALM SPRINGS, Calif. — "Downstream, the predominant system design issues are going to be data design issues."

So said John Zachman, Business Systems Planning (BSP) consultant for IBM-Western Region in Los Angeles. A speaker at International Data Corp.'s Fall Executive Conference on "Distributed Resource Systems" here last week, Zachman took time out to share with *Computerworld* his personal perspective on information systems planning methodologies.

Echoing remarks made during his presentation, Zachman stressed in a later interview the difference between data design and traditional

functional design. In the latter approach, a functional problem is defined and a system is built to automate that function by the quickest, cheapest means possible. While this approach results in cost savings in the short term, significant problems develop later on as the process is repeated and the company's applica-

tions portfolio grows, Zachman explained.

Specifically, those problems are data inconsistency and the inability to change the system quickly — "and the heart of these problems is data related," Zachman stressed. "Data hasn't been managed in such a way that management has the flexibility

to change the infrastructure of the organization quickly."

By contrast, the data-oriented design approach is costly in the short term because it requires an intensive analysis of company data and building subject data bases as opposed to applications data bases, Zachman ex-

(Continued on Page 12)

BSP: A Methodology for Planning

By Catherine Marengi
CW Staff

PALM SPRINGS, Calif. — Business Systems Planning (BSP) is a methodology that was designed to help top-level managers rigorously analyze the data on which their organiza-

tions are built, thereby laying a solid foundation for long-range information systems planning, John Zachman, Business Systems Planning consultant for IBM-Western Region, explained in an interview here last week. BSP is business-oriented in its

approach, but focuses on data issues, he added.

Because a BSP study is exhaustive, "it is costly in time and resources," Zachman noted. For that reason the big interest in BSP is in larger businesses. "The bigger the company, the bigger the data problem. And the bigger the data problem, the greater the inclination to do BSP analyses," the IBM consultant noted.

Critics have argued that BSP tends to be an end in itself. That criticism, leveled at a recent Society for Management Information Systems panel in which Zachman participated, holds that some organizations are satisfied after completing the massive BSP effort, and they do not follow through with the data design and system implementations. "That has sometimes been the case," Zachman replied. "It's a question of how well the BSP study team understood the data issue."

Involvement in BSP

High-level MIS executives should be involved in the BSP effort, according to Zachman. The DP department should also participate "because they'll have to implement what management decides on," the consultant pointed out.

Comparing BSP with information engineering, espoused by James Martin and Clive Finkelstein, Zachman feels that the two approaches deal with the same issues. "[Martin's and Finkelstein's] hypothesis that you can derive functional design from data design is the opposite of what traditional DP has done — and is a revolutionary concept," Zachman remarked.

"While it is still a theory in 1982, my intuitive feeling is that information engineering is the right approach," the IBM consultant pointed out.

Methodology Foundation

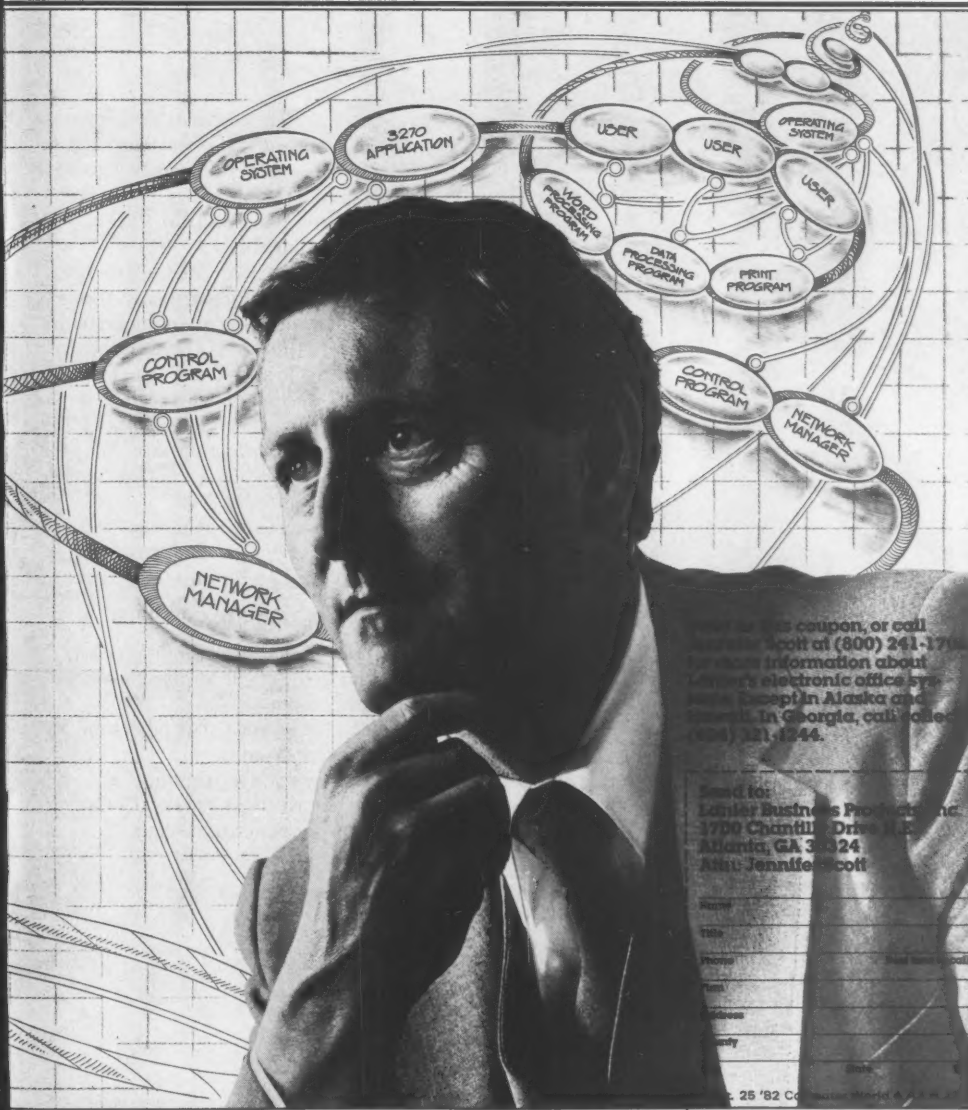
BSP was designed to serve as a foundation for other methodologies, Zachman explained. "BSP doesn't solve problems. It helps you understand them."

While information engineering does its own BSP-type study, according to Zachman, one such methodology that serves as a good follow-on to BSP is IBM's Information Systems Management Institute methodology. Another is the Prototyping Design Methodology, invented by Dan Appleton, Manhattan Beach, Calif., he added.

Calling BSP a "misunderstood methodology," Zachman surmised that it has been used traditionally by people who are comfortable with the function-driven approach. "They may not understand the data issue," he concluded.

"A future."

Bill Kelly, Vice President, Research and Development,
Electronic Office Systems Division



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Micros 'Mixed Bag' in Large Firms, Exec Says

(Continued from Page 1)

"There has been a radical change in [small computer] distribution and supply over the past five years," Seashols observed. "The product is rampant." That scenario was supported by two users who shared the panel with Seashols (see story on Page 13).

Alluding to the blurry distinction between intelligent terminals and personal computers, Seashols offered a definition: "If the individual feels he has control of the system, it's a personal computer."

The end-user demand for personal computers in large firms is "huge" — and it's growing rapidly, Seashols observed. He supported his claim with U.S. Department of Commerce figures on small business computer growth in the 1980-1981 time frame. Whereas all the major suppliers, including IBM, have experienced "flat growth" of no more than 5% in the small business computer area, micro-

computer suppliers experienced an explosive 63% growth, preceded by a 105% growth rate in 1979-1980.

The head-to-head competition in business computers will not be between mainframes and micros, but between minis and micros, according to Seashols. Because of their inherent price/performance advantage, micros pose a serious threat to mini-computers in the \$15,000 to \$80,000 range, he added.

Sorting Out the Options

How does the user sort out the options? First of all, "define your requirements," Seashols advised. "You can't expect your vendor to define those requirements for you."

To that end, Seashols offered the

following selection criteria:

- **Price/Performance.** "Look at the technology, look at the expandability, look at all the things that are going to impact the true price/performance issues," including total system solutions and integration, Seashols noted.

- **Service and support.** Today's user is much more self-sufficient, Seashols observed, and his upfront decision on support may determine whether he buys personal computers from a mail-order firm, a major supplier or a local dealer.

- **Availability.** This issue is often the key, both in terms of present and future utilization, Seashols said.

- **Software.** First consider the applications needed, then the operating

systems and languages, he advised.

- **Hardware.** While hardware prices are becoming inconsequential, key considerations are expansion, future innovations and reliability.

- **Communications.** "Do I need to support Ethernet? SNA? Do I need communications at all or merely stand-alone units?"

- **Education.** "What tools or strategies does the vendor offer? What documentation is needed?"

- **Vendor credibility.** Look for proven success and reputation, not just the size of the vendor, the Dynabyte executive advised.

- **Budget.** "Make this one of your last criteria," Seashols said, warning the user not to leap at an inadequate product because of its low price.

Data Design Held Crucial

(Continued from Page 11)

plained. However, the long-term savings come in the form of data consistency, flexibility to change and the ease of implementing and maintaining systems.

As top management depends increasingly on visibility into business data for resource optimization, the data issue arises: "Do you want to manage the data or not?" Zachman asked. "For top managers to optimize their resources, data has to be managed and designed for those requirements."

Will we see a new breed of management information systems (MIS) executives who are more involved in business and planning issues than in technical issues? "I think so," Zachman said. "I endorse [Richard Nolan's] stage theory. You see distinct changes as MIS matures over time. The stage theory is a useful device for understanding the shift from technical management to business management."

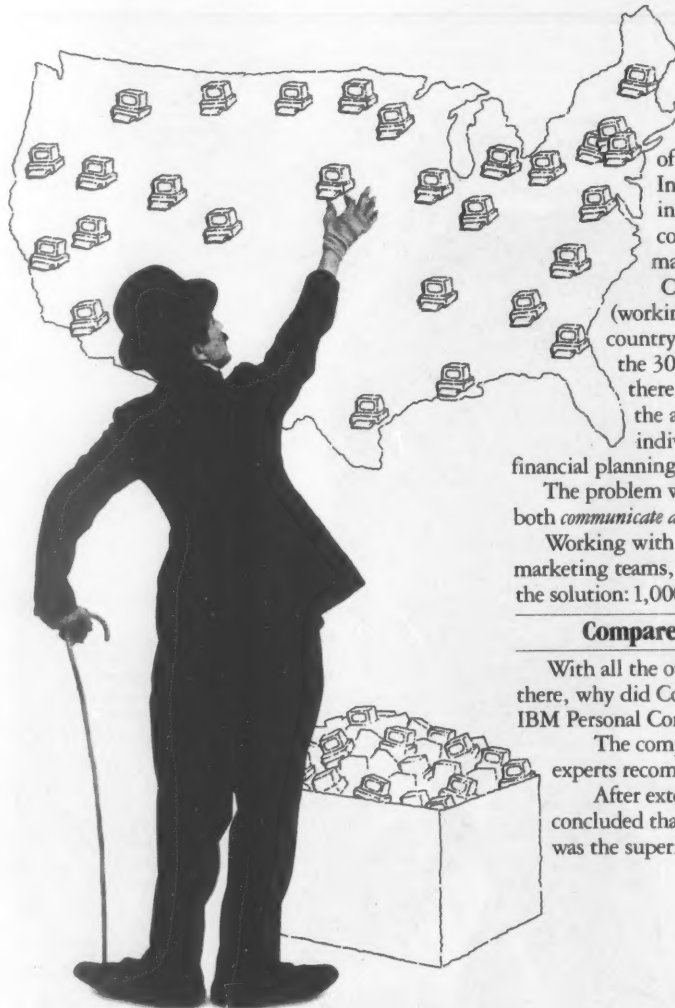
From the other end of the scale, top managers are also gaining a greater awareness of information technology, according to Zachman. "Management is becoming more and more aware that they cannot be ignorant of computers."

"When you consider the future business environment as portrayed by the pundits, the Alvin Tofflers of the world, the rate of change accelerating, decentralization of management, resource constraints — in that environment, it is imperative that businesses have good information systems to maintain profitability and viability," the IBM consultant asserted.

"The top executive is not likely to understand that data is the source of the problem," Zachman said. "BSP is designed to surface the data issue."

How far will top executives become directly involved in data design? "In 1982, very little. In 1992, I suspect, there will be a lot more methodologies and automated tools to let management take part," Zachman predicted.

Hello,



The corporate headquarters of the Connecticut Mutual Life Insurance Company is located in Hartford. So is its central computer, an IBM 3081 mainframe.

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Offers Info Flow, Better Control

Corporate Users Cite Gains From Shift to Micros

By Catherine Marengi

CW Staff

PALM SPRINGS, Calif. — What happens when a corporate computer user leaves the comfort of the mainframe-supported environment to try the untested waters of personal computing?

Two users who took that bold step shared their strategies at a panel titled "Personal Computers in Large Corporations" at International Data Corp.'s Fall Executive Conference here last week.

John W. Maxwell, second vice-president at the Travelers Insurance Co., Hartford, Conn., described his company's approach as "going beyond

data processing to information processing," with decision support systems a practical objective.

What were the critical forces behind the introduction of personal computing at Travelers? Maxwell listed the following factors:

- The demand for DP exceeded capacity.
- People had begun to "think computers," and their expectations had been fueled by vendors' marketing programs.
- Software availability. "Market successes like [Visicorp's] Visicalc have lured thousands into the fold," Maxwell said, adding that there are now 17,000 packages that can run on

an Apple Computer, Inc. micro.

• Nonprocedural languages that provide all the benefits of traditional languages, including Focus, Nomad, Ramis and NPL.

• Price/performance. "Cost is no longer a factor," Maxwell suggested. Personal computing has its roots in the office automation concept, Maxwell said. "All industries share a common problem — the rising cost of the office function."

"Until now, the focus has been on improving clerical productivity. Now we must focus on managers and the total information flow," he added.

Citing paperwork reduction as the

'No longer viewed as extensions of DP, personal computers at Travelers are finding a permanent place in in-house time-sharing, an information center, an in-house computer store and in more than 1,000 end-user applications ... [The] manager of TV network information systems planning at NBC in New York [sees] personal computing as an "interim solution."

key to office productivity, Maxwell targeted half of all paper forms at Travelers as candidates for automation via personal computing.

No longer viewed as extensions of DP, personal computers at Travelers are finding a permanent place in in-house time-sharing, an information center, an in-house computer store and in more than 1,000 end-user applications, Maxwell reported.

A more tentative strategy was outlined by Berkeley McKennon, manager of TV network information systems planning at NBC in New York. McKennon offered personal computing as an "interim solution."

Cautioning that he was not indicting management information system (MIS) departments, which are facing heavy work loads and budget squeezes, McKennon cited the typical two-year application backlog associated with the mainframe environment.

What can be done? Because of the low cost of personal computers, McKennon proposed "the old do-it-yourself game." End users can and should take control via personal computers, he added.

Perfect Fit

Concurring with Maxwell, McKennon cited the perfect fit of microcomputers to the office. In particular, micros:

- Fit into small spaces and on desks.
- Require no special electric outlets or air conditioning.
- Require supplies that are no more complex than traditional office supplies.
- Are simple to maintain and have serviced.

Training can be difficult, McKennon acknowledged, but he added, "I submit that if you require a heavy dose of training, you picked the wrong machine."

McKennon described selection priorities as follows: "First identify the problem. If you can't do that, you don't need other things. Then look for the software program you need. Then the hardware — in that order."

Justifying the interim solution from a cost perspective, McKennon concluded, "If MIS can't get to you in two or three years, you can solve your own problems in the interim. If MIS gets back to you with a perfect solution, throw the micro away! It will have paid for itself."

"But MIS has not been knocking on our door," he added, "and we have no problems left for them to solve."

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'Sun Setting on DDP,' Researcher Maintains

By Catherine Marengi

CW Staff

PALM SPRINGS, Calif. — Distributed data processing (DDP) is a thing of the past.

"Dead. Gone. Buried. The sun is setting on DDP," according to William F. Zachmann, vice-president of research for International Data Corp. (IDC). "What we are going to see instead is distributed resources systems [DRS]."

Speaking at IDC's Fall Executive Conference titled "Distributed Resource Systems" here last week, Zachmann continued, "What we are seeing is a reversal of the Copernican Revolution." Just as Copernicus recognized the sun as the center of the universe, so traditional DDP has

been founded on a large central computer with some functions dispersed outward: "cluster controllers and minis revolving around the computer room," Zachmann commented.

Upholds User View

In contrast with DDP, in which "the computer room is looking outward," DRS upholds the user view that "the center of the system is wherever I am," Zachmann noted. This means that the resources available on the network will appear as extensions of the capabilities of the individual resource station, and they will be transparent to the user.

DRS will be characterized by "multiple processors loosely coupled and providing functional capabilities as

extensions of other capabilities," the IDC vice-president said, adding that the local-area network thus becomes "a backplane bus of the supersystem." The network itself is viewed as a single system — comparable to a corporate "nervous system."

The challenge for DRS is to close the machine-user gap between the level of function the machine provides and the level of function the user requires, Zachmann said, noting the following user interface needs:

- High-resolution image.
- Voice recognition and output.
- High-speed access to high-volume data.
- Multiple data types.
- Full-function information manipulation.

- Bit-map displays.
- Natural-language capability
- Expert systems capability.
- Self-adaptive behavior.



CW Photo by C. Marengi

"What we are seeing is a reversal of the Copernican Revolution," William F. Zachmann maintained.

The vendors who will be important in the future are those who will be able to close the machine-user gap and anticipate end-user needs, Zachmann predicted.

"There's no stopping them end users," Zachmann quipped. "If you want to try, practice by standing in front of a locomotive at night."

Closing the Gap

What will bring about this Copernican reversal and close the machine-user gap? "The emerging generation of microprocessors opens the door to very fundamental changes in system architectures," Zachmann said, citing the following as key microprocessor architectures:

- Intel Corp.'s 8086 family.
- Motorola Corp.'s 68000 family.
- National Semiconductor Corp.'s 16000 family.
- Intel's iAPX 432.
- Reduced Instruction Set Computer (Risc) and IBM 801 research projects.

Whereas mainframe architecture, particularly IBM 360- and 370-type interrupt-driven architecture, set the pace for technology in the '70s, "it is microcomputer architecture that will set the pace for industry in the '80s," Zachmann declared.

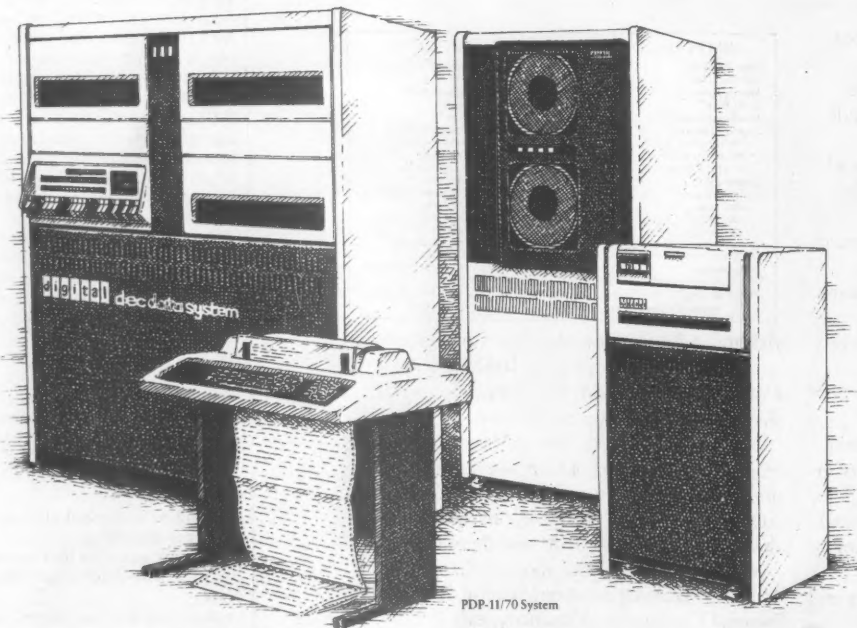
The role of the microcomputer in DRS will be significant at two levels: (1) in the micro-provided machine interface and (2) in integration architectures, both internal to a system and external across a local-area network, Zachmann pointed out.

When asked if the IBM 3270 will be around in 1990, Zachmann replied, "Yes — in museums. Much more lively, more versatile workstations will be the norm."

"A terminal in the old sense is dead," he continued. "It's obvious that a personal computer can do what a terminal can do, and more, at close to the same price."

DRS demands a shift in perspective from the raised-floor environment of the computer room to that of the end user. "To call DRS the same thing as DDP is like pouring new wine into old bottles," the IDC vice-president concluded.

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Biggest Problem for Head Of FBI's Computer Crime Training? Budget Constraints

Will the quality of computer crime training at the Federal Bureau of Investigation influence routine and not-so-routine investigations in the DP environment? To find out, Computerworld Staff Writer Jim Bartimo recently visited the computer crime training program at the FBI Academy at the Quantico Marine Base, Va. Some 200 of the FBI's 7,500 agents have "graduated" from the intensive crime course since it began in the 1970s.

Bartimo talked with Supervisory Special Agent John Lewis, head of the computer crime training program. Lewis has been with the FBI for more than 10 years and with the FBI Academy since 1977.

Critics say that data processing professionals cannot depend on the FBI to deal with computer crime. How would you respond to them?

Well, I guess I'll answer that by saying that we don't have people in every one of our offices who have had the opportunity to come to this course — not even saying that if they came to this course that they would be able to do anything any way.

Due to budgetary

constraints, manpower constraints and a variety of other things, we don't have the opportunity to make sure that every single one of our field offices has at least one person who has taken the [computer crime training] course. That, I think, is the problem.

How long will it take before you have one person who has taken the course in every office?

I quit two years ago trying to do that. Now what I try to do is train as many [agents] as I can and hope they get [moved] in there. I would say within probably two, three or four years, we'll probably have

one in every office. We have 59 major field offices, and out of those I think we have six offices that don't have anyone [who has gone through the program].

(Continued on Page 16)



CW Photo by J. Bartimo

This Time: \$1.1 Million Wire Fraud Hits Another Calif. R

By Jeffrey Beeler
CW West Coast Bureau
BEVERLY HILLS, Calif. — Like earthquakes, illegal wire transfers continued to shake southern California last week as the Federal Bureau of Investigation issued arrest warrants for two men accused of fraudulently wiring \$1.1 million from City National Bank here to New York City. Kelley, alleged theft by City National Bank, Jason Richard

New York City was scheduled offense, Riff lowering an same Los million

Student Charo

By Jeffrey Beeler
CW West Coast Bureau
SAN JOSE, Calif. — Jose State Univ. has been charged

but \$150,000 dollars in Smith's bank account" when he was apprehended, Allison said. "He spent \$27 million in two years" IPO/E, MVS/SP

DP Scam Nets Over \$4 Million; Six Indicted

Alleged Embezzler Nak

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Bank Swindler Gets 10 Years
By Jim Bartimo
CW Staff
ANGELES — What was re
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in the Well

August 23, 1982

Allegedly Manipulated Computer Ex-Bank Supervisor Charge

By Jim Bartimo
CW Staff
BOSTON —

Budget Curbs His Biggest Problem

(Continued from Page 15)

Is there enough computer crime training going on in law enforcement agencies today?

No, we don't train as many as we could — here or away from here. I'd like to see there be more.

As more and more businesses use computers, these agents need to learn about computers, whether it's computer-related crime or not. They need to know what that machine is doing within that business environment.

Many believe that there will be a major increase in computer crime in

this decade. Will you step up training to meet this anticipated increase?

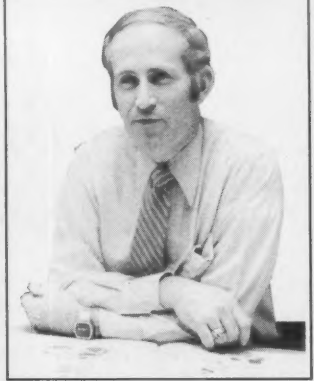
[Going along as we're going] is the only thing we can do. If we were a private institution, fine, we could come up with as many courses as people could afford to pay for. But as a governmental agency and having the budget be a very real thing, we can only operate within the constraints that we've got. If we don't have the money, the time and the manpower, we don't do the school.

How is training handled in other law enforcement agencies, like state and local police?

Training in computer crime is almost nonexistent. There have been some course offerings that were about a week in length. That and the course we offer are the only courses I know of.

How much computer crime training do your agents receive before going out in the field? How is this training structured?

We have a training program that is three weeks in length. We bring FBI agents in from the field. They have previously gone through their new agent training program. Much of it is hands-on training with the IBM System/3 we have here.



We're fortunate to have on that system a simulated banking package. We use the System/3 because it's very easy to operate. We show them how to operate it. We then utilize the programming language RPG-II. We teach them some standard programming, not to make them programmers but to force them to use the machine.

Then, through the simulated bank, and some other fraudulent packages, we give them some fraud scenarios just to see how they handle it. As they learn more about the computer, the scenarios become more and more difficult — more and more challenging to them.

The idea is to see if they can solve it, but more importantly, to see if they can see what happened. It's done with the intent in mind that if it were a real-life situation, they would be in a position where they had to go from a very technical area of DP and be able to interpret what happened in that environment and take it into a courtroom, where other people there are not going to have the expertise in DP, and be able to explain it in a logical way.

The overall objective is to enable them to go in and conduct an investigation in a DP environment and behave in a professional manner. The training goes on all day, all night.

Florida Democrat Bill Nelson has introduced a bill in the House of Representatives (H.R. 3970) that is designed to define more clearly computer-related crime. What will this bill do and what will it mean to the training of agents?

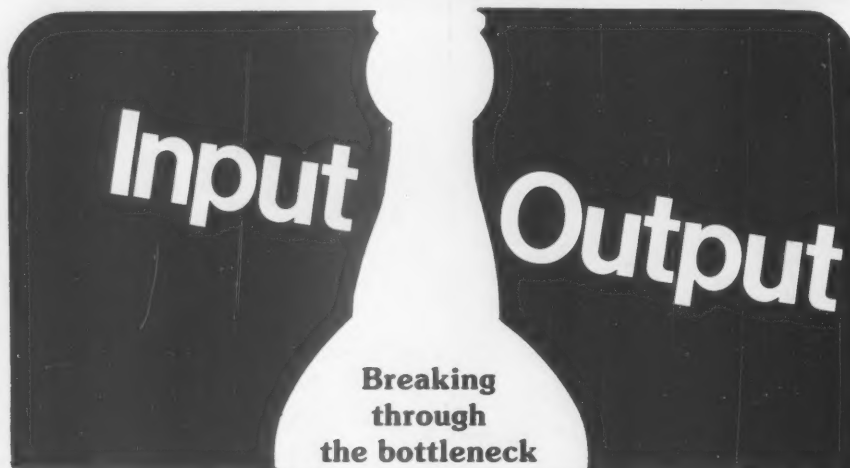
Regardless of what I think or what the FBI thinks, if that bill passes it will define what computer crime is. There is no real policy in the bureau right now.

Presently in the FBI if we have a case that involves a federal computer, a myriad of violations can be used to prosecute that. The thrust of this bill, the way I understand it, is to make one statute that says if a computer is involved, boom, you can prosecute.

It will make prosecution of these cases probably easier. I don't know that it will make the sentences any harder.

Whose job is it right now to prosecute computer crime?

Right now the decision is not ours, it's the Department of Justice's. The FBI would be called in and we'd do a preliminary investigation.



A powerful CPU is like a clever mind. Neither realizes its full potential without the ability to listen and reply. I/O bottlenecks stifle the responsiveness of any good system.

In the *Computerworld* November 29th Special Report on "Computer Input/Output," you'll read how to get more I/O for the dollar. Editor Tom Henkel has gathered material from experts involved with all the latest techniques in data entry; from networking to the use of micros, from voice to videotext. You'll get articles and tutorials on using COM, optical character recognition, demand deposit accounting systems, and more.

According to International Data Corporation, the world's largest computer industry research firm, the hottest area in the output side of the market is in printers because of the success of desktops, most of which have one printer per system. At this low end, in the business/professional segment of the desktop market alone, 301,000 printers were shipped in the U.S. in 1981. There were 773,000 total printers (not including high-end electronic typewriters) shipped in the U.S. in '81. On the input side, CRT's are the hottest market segment with more than 1,088,000 CRT's shipped in the U.S. in 1981.

Keeping up with this market is vital to the success of any operation, and this November 29th — you'll be brought up to date. And if you sell to buyers in the I/O marketplace, you'll want your ad where your buyers are — reading "Computer Input/Output" in our November 29th issue. Ad deadline is November 12th. Call your *Computerworld* sales representative listed below, or, for more information call Don Fagan, Vice President, Sales, at (617) 879-0700.

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Reform '88 Draws Wide-Ranging Responses

By Jake Kirchner

CW Washington Bureau
WASHINGTON, D.C. — Response to last month's White House announcement of a management reform project that would include making all federal agencies' administrative DP systems compatible has ranged from puzzled best wishes to incredulity from top-level policy makers here.

While it has been no secret that the thousands of agency systems constitute a baffle of operating systems, applications programs and incompatible, often obsolete, hardware, it is also remembered that more than one administration has thrown up its hands in despair about doing anything to lessen this technological confusion.

Agencies Reserving Judgment

In the agencies that will be affected by President Reagan's sweeping Reform '88 project, people are adopting a wait-and-see attitude.

Frank Carr, head of the General Services Administration's Office of Information Resources Management, said of the Reform '88 group: "I don't envy them their job ... There are a lot more questions in the project than answers at this time."

Carr suggested it would be "scary" if the task force tried to "start from scratch" and design governmentwide compatible systems. He noted that for decades, attempts to consolidate systems in government and the private sector have usually been unsuccessful, if not disastrous.

He said every system has its own specifications, and most also have other functions — extraneous to the main purpose of the system — integrated into them. Dealing with those problems, as well as resolving issues of software conversion and documentation, will be difficult for the task force, he predicted.

But Carr, who describes himself as "always an optimist," said the mere fact the task force "is trying to wrestle with these problems" could very well lead to some benefits, even if its goals have to be pared down to fit the reality of agency DP practices. And using the clout of the Office of Management and Budget's oversight authority, the task force's presently high goals "may be more easily achieved than you might think," he said.

This attempt to find a way out of the labyrinth of federal computing is generally welcomed throughout the government, but the work assigned the Reagan "Reform '88" task force by Presidential Counselor Edwin Meese III probably would have daunted Theseus himself.

As one example of the task force's goals, Meese told a Sept. 22 White House press

conference that "if you have 1,300 or so [federal] payroll systems ... there's no reason why we shouldn't have a single system with a limited number of service centers at least not greater than one per department to do the payroll work" [CW, Oct. 4].

Hesse More Realistic

Task force director Martha O. Hesse, while no less optimistic, may be more realistic.

She told *Computerworld* recently, "We are not talking about a centralized system [for any one management function]; we probably aren't even talking about five systems."

Hesse, who comes to the government from management-level positions in the private DP sector, has no illusions about the enormity of her job. "It's going to take a tremendous amount of ef-

fort," she said of the numerous management reform goals of her task force. Nonetheless, she maintained putting the government on the road to systems compatibility is "a reasonable goal ... a doable project."

She emphasized government must start coming to terms with the growing financial demands of its DP operations and get a better

(Continued on Page 18)

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Varied Response Greet Reform '88

(Continued from Page 17)
handle on information processed by the agencies so that the federal government can be better managed. She conceded that reaching systems compatibility is not just a matter of replacing hardware, as Meese indicated, but will also include overcoming considerable software conversion problems.

For now, the task force is trying to sort through the information coming in from

the agencies concerning their systems. Hesse's group hopes this will lead to development in the next few months of a model of what is practical and feasible in systems compatibility. Until that point, she said, no estimates of costs, time or ultimate success can reasonably be expected from the task force.

Congress, which has been uniformly critical of just about everything coming out

of the administration of late, can be expected to cast an equally jaundiced eye on the Reform '88 efforts.

One Capitol Hill information policy advisor quickly dismissed the task force's work, saying, "There's so many real problems out there with computers getting old and aging and [agencies] having lower budgets ... Compatibility is not necessarily desirable: If it costs too much money it's ridiculous," the advisor said.

That observer may not have written the project's epitaph, for the congressional oversight committees that must approve any plans and expenditures for restructuring agency DP systems can probably be counted on to show at least initial forbearance for the Reform '88 project. But in the end, it may be in the mazes of Congress that the task force meets its first Minotaur.

Call for Papers

INTERNATIONAL CONFERENCE ON COMPUTER CONFERRING (ICCC) '83, Boulder, Colo., April 4-5.

Papers and panel discussion proposals are being solicited on the use and integration of computer conferencing, text teleconferencing, graphics or applications programs and related topics for organizations, education and business. Submissions should focus on computer teleconferencing systems, software design and development, applications of technology, ergonomics, case studies, demonstrations, future trends in society and technology, graphics, data base management, decision support systems and artificial intelligence.

A one-page abstract or completed original paper (less than 20 pages) including author's name, affiliation and title, address and telephone number should be sent by Dec. 1 to ICCC Conference Committee, Suite B, 934 Pearl, Boulder, Colo. 80302.

NATIONAL EDUCATIONAL COMPUTING CONFERENCE (NecC) '83, Baltimore, June 6-8. NecC is seeking papers from all academic disciplines and research areas in educational computing. Actual experiences with computer use in the classroom at all levels of education are encouraged.

Authors should submit an original manuscript (double-spaced, maximum 15 pages) by Dec. 15 to A.J. Turner, Department of Computer Science, College of Nursing Building, Clemson University, Clemson, S.C. 29631.

NecC is also inviting speakers on the current status of the educational use of computers. In addition, a series of 15- to 20-minute informal project presentations will be considered on such topics as curriculum, course and software development.

Ideas for sessions and participants should be submitted by Dec. 1 to Jean Rogers, Department of Computer and Information Science, University of Oregon, Eugene, Ore. 97403. Persons interested in presenting a project report should submit a one-page summary by Dec. 15 to William Ryan, Computing Center, Swarthmore College, Swarthmore, Pa. 19081.

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No Application Generators Exist, Exec Contends

By Lois Paul
CW Staff

NEW YORK — "In my estimation, we don't have any application generators in the marketplace today."

With this statement, Nick Wright, manager of business products planning for Perkin-Elmer Data Systems, a division of Perkin-Elmer Corp., began his presentation before attendees at the recent ninth annual International Information Management Exposition & Conference here.

"We have application development systems," he explained, but "not achieved the next step forward" application generators. He defined the latter as a tool that gives end users the capability to generate their own applications instead of relying on data processing.

Application Backlog

Wright described the gap between increasing end-user demands for applications and the capacity of data processing to fulfill those demands. The result is the growing applications backlog.

"Tools must be developed to allow the analytical end users to develop their class of applications — in many cases, by themselves," he said.

"The next challenge is to build a true application generator that addresses the analytical end user and allows him to build systems," he said. "We have to address the problem at its source," increasing the capacity curve to match the demand curve by making the end user a programmer of his own system.

He suggested that many of the application development systems are

"monolithic," whereas a layered approach would be more appropriate. This would involve a query language/report writer, application generator and procedural language layered over a data management system.

Message Game

He compared the application development process to the "pass the message game" at parties in which the first person's message invariably is quite different from the version the last person in line receives. It "usually ends up with unsatisfied users and an instant rash of maintenance and enhancement requests."

The two poles of applications needs that currently are being addressed by

available tools are simple queries and reports and complex data base management applications. The void exists in the area that he called well-defined applications, which generally require a professional programmers' assistance.

Products such as report writers, data base management systems and teleprocessing monitors address these applications from a specific point of view. They also are extending their capabilities, growing into full application development systems, he added.

Required Features

According to Wright, bringing these products the step further to become application generators requires

the following combination of features: a screen form definition feature, file and definition capabilities and procedure definition.

It is the last ingredient, which requires the involvement of a programmer, that generally is missing. Procedure definition entails screen-file linkage, screen-screen linkage, file-report linkage and complex logic/arithmetic rules. "This is an area that really hasn't been addressed very well," he said.

Wright suggested that future developments toward true application generators will involve a relational view of data that will bring an interface to the data base nearer to the end user.

Swedish Body Seeks Sobriety With ID System

STOCKHOLM, Sweden — Drinkers in Sweden have been put on notice that the days of wine and roses may have hit a sobering "STOP RUN."

If teetotalers in the Swedish Parliament have their way, temperance-minded CPUs will arrange short shots for the overindulgent.

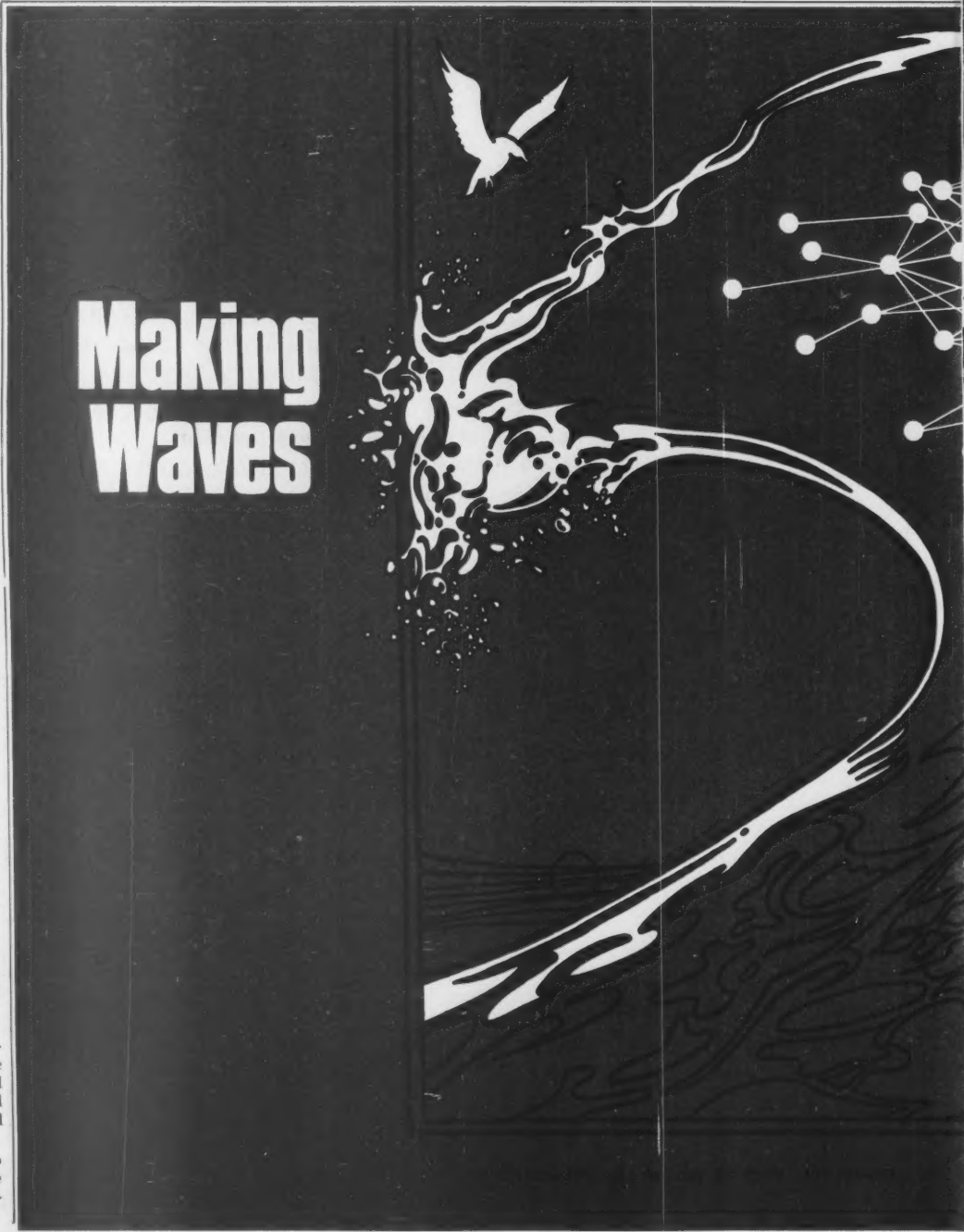
The ruling Center Party has determined the alcohol problem in Sweden has gotten "out of hand," according to party leader Marianne Carlson.

In an effort to quell the quaffing of excess libations, the party is proposing to employ computer checks to limit liquor purchases in state-controlled liquor stores.

If the measure passes, drinkers will have to produce special identity cards to obtain weekly rations of their favorite spirits.

When a customer has already purchased his limit for the week or if the customer has a history of alcohol abuse, the computer at the store will spit out the card and activate a red warning light.

Those unfortunate imbibers who get the red light repeatedly could be forced to undergo treatment for alcoholism.



Making Waves

Dramatic Productivity Gains Possible Resisting Nonprocedural Tools Seen as Threat

By Robert Batt

CW West Coast Bureau

LOS ANGELES — Application developers who resist the use of nonprocedural fourth-generation languages are a productivity threat to their companies, a senior management consultant has claimed.

The productivity gains made possible by these new languages can be so dramatic that DP professionals who fail to realize their capabilities may suddenly find themselves far from the state of the art, Charles Milbourne, an applications consultant with Time-Sharing Applications and Consulting Services, said here recently.

Milbourne, whose Encin, Calif.-based company specializes in end-user computing, says there is a built-in resistance to fourth-generation language tools such as Information Builders, Inc.'s Focus, Mathematica Products Group, Inc.'s Ramis II, and National CSS, Inc.'s Nomad by management information systems departments fearing a loss of status and control. "Most DP organizations are highly centralized. They don't want to lose control. They want to approve every single application, choose all the software and cannot conceive of their end-user community as a market."

Nevertheless, with the growing ac-

ceptance of the information center concept pioneered by IBM, nonprocedural languages have been given a boost in the past two years, according to Milbourne. In an information center setting, end users are developing good fourth-generation language applications, putting the DP community to shame, he noted.

Nonprocedural Languages

"These new languages have become a way of appeasing angry end users who are fed up with not having a tool they can use for their own applications development. As a result, nonprocedural languages are beginning to be used by DPs for devel-

oping applications sitting in a backlog," he added.

Milbourne asserted that while large, structured integrated applications are suitable for traditional procedural languages, 75% of applications are decision-support applications for which fourth-generation languages are ideally suited. However, he warned that DPs will require a different set of application methodologies than those to which they have become accustomed if they are to be successful with a nonprocedural language. Knowledge of procedural languages such as Cobol, Fortran and PL/I, he argued, is a hindrance when it comes to learning the new methods because DPs typically attempt to fit old procedures into the new environment.

Structured methodologies require a step-by-step approach including feasibility analysis, functional and design specification, development and implementation, which often add unnecessary time to the development cycle. Nonprocedural approaches, such as prototyping, and fast-response methods that involve a good deal of interaction with end users can result in significant productivity advances, Milbourne said.

Yet precisely because of such advances, the consultant argued, there is an ingrained mistrust of fourth-generation languages. "Bureaucracy as it exists tends to defeat the proliferation of nonprocedural languages."

Too few DPs, asserted Milbourne, really see the opportunity presented by being skilled in both structured and nonstructured methodologies. They fail to realize the advantage presented by being able to make a distinction between applications requiring different approaches.

Once these advantages are realized, he argued, significant increases in productivity are possible. DPs will become more like systems analysts than programmers. They will take responsibility for an entire application, and the need for divisions of labor will not be so great.

Asis Papers Out in Print

WHITE PLAINS, N.Y. — Knowledge Industry Publications, Inc. is offering a compendium of papers presented at the 45th annual meeting of the American Society of Information Sciences (Asis) held this month in Columbus, Ohio.

Called "Information Interaction, Proceedings of the 45th Annual Meeting," the publication covers such topics as the growing use of on-line public-access catalogs and some critical areas for redesign, problems and effects of introducing new information technologies into organizations, why some people learn to use computers more easily than others and pricing strategies for products and services, the firm said.

The book costs \$19.50 (\$15.60 for Asis members). Knowledge Industry Publications said from 701 Westchester Ave., White Plains, N.Y. 10604.



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Futurist Sees Programmers Out in Cold by '90s

By Marguerite Zientara
CW Staff

ARLINGTON, Va. — By the end of the decade, conventional programmers will be left out in the cold because people in all professions and disciplines will be "writing and peddling" their own application software.

So predicted futurist W. Clyde Helms Jr., president of Occupational Forecasting, Inc., a firm that specializes in projecting technological trends. "With the tremendous advances in computers, particularly with reference to artificial intelligence, within the next few years most anyone will be able to write a computer program in plain English," Helms said during a recent inter-

view.

"This means that the need for high-order computer programmers with Fortran, Cobol and PL/I experience will disappear," he projected. "The computer manufacturers are making the machines so simple today, for example, that you can sit down with your own personal computer and write your own bookkeeping and accounting system."

Out of this situation a new, more generalized occupation, "software writer," will appear, Helms said, estimating a legion of 1,830,000 software writers will exist by 1990. Applicable to all professions involving logic — including medicine, law, engineering and education — the software writers will do "front-end planning,

layout, designing and defining." Comparing the concept to the California-based Nobel sperm bank, Helms said, "Software writers will pick the brains of the most brilliant people, define their mental pathways and flowchart them."

"These writers will define innovation and deduction, then give this protocol to conventional programmers who will put it into machine language for a computerized information base," Helms explained.

Professional activity will be transferred "from the individual to the masses," Helms said, noting that a handful of software writers will be able to handle the work of hundreds of analysts.

"By the time you generate and de-

bug a new software program today, it takes months, even longer," Helms noted. "But with the urgency of problems and with the speed and capacity of the computer, we can no longer afford to waste the time for well-educated professionals in arts, sciences and technology to sit down and explain their needs in detail to a programmer, who then has to go write the software."

"In the process of passing through several iterations, much of the initial sense — if not the actual information — is lost to the programmer," he pointed out.

"If Einstein were alive today and [experts] could sit down with him on his intellectual level and 'pick his brain' about how he thinks, if we could flowchart his logic processes — and we can — and create a logic diagram of his thinking, we could then put any type of problem into that diagram and the problem would be solved," Helms said.

But have we reached the point of being able to analyze the workings of the brain? "I think the brain has been charted almost in its entirety now," Helms said, noting that with positron emission technology "the scientist can even watch a brain function and analyze just what parts of the brain are involved, given certain problems that are presented to the live subject."

And what should conventional programmers do to prepare for this future? "They should take a second degree in their area of interest; they should become professionals themselves," Helms advised, noting that despite the current great demand for programmers, they "don't have a golden latch key on security for life — they're just as susceptible to change as the rest of the world."

Manufacturers Using ESS Said 'Very Pleased'

NEW YORK — Manufacturing firms that use an executive support system (ESS) for their top managers were the subject of a survey presented by Adam Crescenzi, vice-president of Index Systems, Inc., at the recent ninth annual International Information Management Exposition and Conference here. The companies surveyed included such large manufacturing firms as W.R. Grace and Co., IBM and Hughes Aircraft Co.

ESS satisfaction levels among these companies "ranged from 'impossible to do without' to 'very pleased,'" Crescenzi said.

Seven of these companies said the chief executive officer was a hands-on user. "Most systems had a senior executive driving the development," Crescenzi said. The start-up of an ESS in the companies surveyed ranged from \$50,000 to \$150,000. "These people were able to build these systems on top of the existing data bases," he said.

Most of the companies looked at the ESS as an experiment, but found that no hard cost-justification was necessary to continue it.

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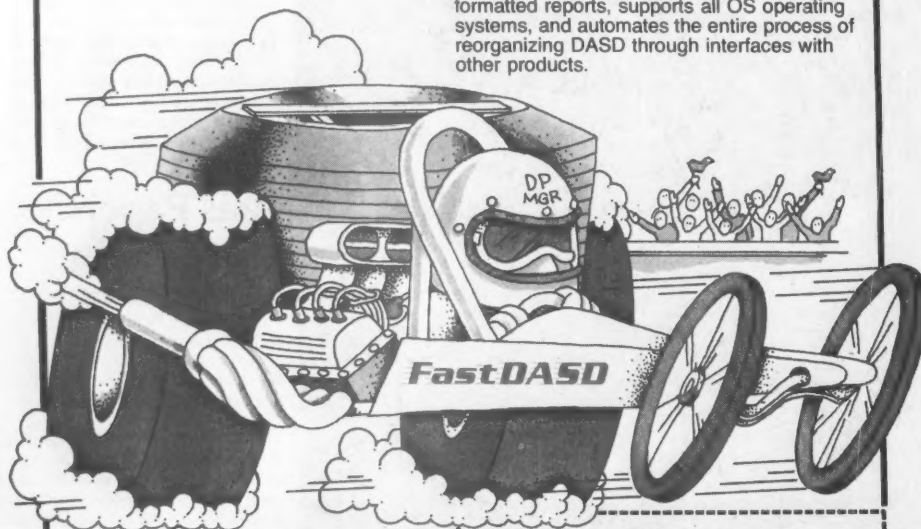
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Users Warned of Pitfalls, Risks In Implementing Info System

By Bob Johnson

CW New York Bureau
NEW YORK — Implementing a new information system can be a trying experience for a company, and if the organization cannot adapt to the change it will find itself faced with failure.

Charles J. Singer, senior associate at Index Systems, Inc., told attendees at the ninth annual International Information Management Exposition and Conference here recently that organizational change management is crucial to successful implementation of new systems. He added that implementation failures are frequently surfacing, and he blamed companies for improper planning and a lack of understanding of just what impact a new system will have on their organization.

Why do systems fail within companies? Singer cited the results of an Index Systems study of 18 different companies, all users of a variety of equipment ranging from office automation systems to large-scale DP systems. The study found that of the 18 companies, all of which had "technically successful" systems (meaning they performed the way they were supposed to), 15 of them were not achieving anticipated results. Only three of the systems studied proved to be successes.

Three Major Factors

"We were intrigued about what causes a system to be counterproductive," Singer said. He cited three major factors that contributed to implementation failures:

- The cost of the system exceeded its benefits.
- The system was underutilized.
- The system was not accepted by the users.

Singer suggested that professionals who are considering the installation of new systems look at three key areas when planning initial implementation strategies.

First is how users and management look at the installation of systems. On many occasions people are "naive" about just what a system can and will do, he said. "Users often have the wrong expectations about systems, and when they don't live up to their expectations they are perceived as failures."

Another implementation problem arises when the expectations of what a system can do are oversold to management by the information systems department, Singer said. He added that the information systems people will oversell the system, under-

sell the cost and hype expectations. This becomes dangerous because it can create an antagonistic relationship with management.

The second key area to consider is the pace at which change is to occur. Singer said that the project has to take place relative to the company's capacity of support staff and not simply

when it is wanted by users.

The third and most interesting key area is user reaction. Singer said that attitudes about switching from a manual to an electronic system are extremely important, especially among supervisory personnel, in gauging how the system will be accepted and how productive it will prove to be.

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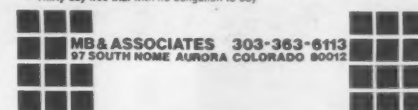
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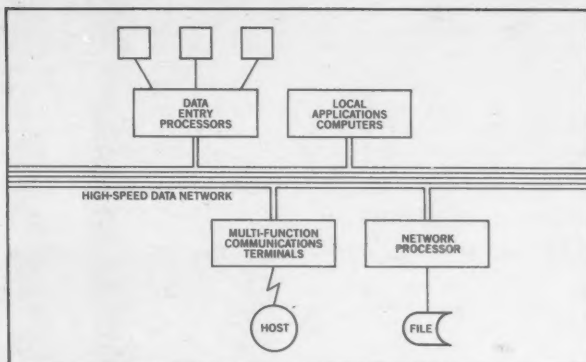
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Combines Two Functions in One

RDC Exec Explains Decision Support Center

By Lois Paul
CW Staff

NEW YORK — Where does an information center end and a decision support system begin?

According to a session entitled "Decision Support Software — Current Offerings, Selections and Trends" at the ninth annual International Information Management Exposition and Conference here recently, the two concepts actually should be combined into something called the Decision Support Center (DSC).

The DSC, a new acronym coined by Real Decisions Corp. (RDC) of Stamford, Conn., provides end users with access to both internal and external data, support and "responsive and reliable computer facilities," according to Len Bergstrom, the session chairman and director of client support services for RDC.

Bergstrom introduced several DP managers who described their application of the DSC approach. One of these was Arthur Levin, manager of time-sharing services for Chesebrough-Pond's, Inc. in Trumbull, Conn.

In 1981 his firm conducted a year-long study to determine how to decrease both costs and development backlog.

It began by surveying the client departments to determine user needs and setting up decision analysis criteria that were ranked in importance

by an evaluation team.

The products chosen were Express from Management Decision Systems, Inc. as the decision support system, Focus from Information Builders, Inc. for data management and FCS-EPS from EPS, Inc. for financial modeling. IBM's VM/CMS was chosen as the operating environment.

These choices were made based on the fact that the ultimate end users were going to be accountants, Levin said. Therefore, the products had to be easy to use. The company selected firms with large user bases because of an unwillingness to "blaze trails" with an untested firm. They also

Telexchange Sets Meeting for Jan. 31

IRVINE, Calif. — Telexchange, a user group for Telefile Computer Products, Inc. and Xerox Corp./Sigma users, has scheduled its winter conference for Jan. 31-Feb. 2 in Long Beach, Calif.

Membership in the group is open to users of Telefile T-80 series and Xerox/Sigma computers with Telefile enhancements, software and maintenance as well as noncontract, real-time and CP-V users. Formed in June 1982, the group has about 100 members and holds semiannual meetings.

Information and registration is available from Brian Edens, 17131 Daimler St., Irvine, Calif. 92714.

looked for technical assistance, stable vendors, flexible reporting capabilities and an ability to handle "what-if" scenarios.

Levin said Focus handles more of the transaction-oriented details and is geared more toward operational functions than planning. Express solves more of the decision-support-type applications.

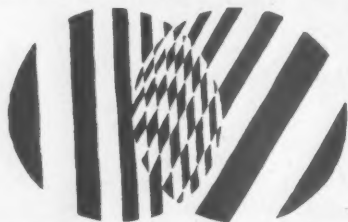
The six-month-old DSC is staffed with support personnel who were chosen because they were analytical, had MBA-type backgrounds, were good communicators, service-oriented, self-motivated and experienced, Levin noted. "I would not recommend taking people out of the man-

agement information department," he said, because these people often are not oriented to the end-user environment.

The ongoing work of the DSC is to establish criteria, communicate, modify, search for opportunities and build support down from the executive level, Levin explained. One way they accomplish this latter step is by showing management the progress of various systems through prototyping.

The DSC charges users for its services, encouraging them to retain control over spending. They do not get involved with development work, Levin stressed.

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Beverage Firm Gets Real Thing With ESS

By Jim Bartimo

CW Staff

NEW YORK — While many companies considered installing an executive support system (ESS) for top management, John Reid, director of planning at Coca-Cola U.S.A., decided 1½ years ago actually to do it.

Reid spoke about avoiding the pitfalls of this new concept at the ninth annual International Information Management Exposition and Conference here recently.

An ESS is a data base or series of data bases that provide senior executives with easy-to-access information designed to help them make better and faster decisions. "It should be based on models, menus, formats and ad hoc work," Reid said.

At Coca-Cola, 11 separate data bases were holding too much information for a top executive to sift through for a quick decision. "We had an unwieldy situation. We had to summarize each data base," Reid said.

The most important decision to make was what data and how much data should be summarized. "You have to decide whether you're going to stop summarizing at 1970 or 1950," Reid said.

Currently held information in existing data bases should be summarized and "enriched," Reid said. Enriched data goes one step further

than existing information by including an historical perspective.

For instance, the sudden 1975 price increase for sugar was very important to Coca-Cola. So, the financial figures for 1975 needed to be "enriched" with that historical information.

Among the information that also should be included in an ESS is forecasts, plans and budget and simple mod-

els, Reid said.

While many DP managers find much of the new technology easy to use, Reid warned that those using an ESS are not technically sophisticated. "User-friendly is not friendly enough for top management," he said.

Reid also warned that when the idea of an ESS is introduced, many arguments will be made against it. Among them is the "one-computer

argument" that says a corporation should have all its data on one computer.

Another argument says that all corporate information should be in one data base. "I found out that this means installing something like 3,000 disk packs," Reid said.

Once these arguments are won, whoever implements the ESS must also beware of putting too much or too little information into the system.

"It shouldn't be too personal or too corporate," he said.

The data in the ESS should be consistent, relevant, manageable and not duplicated from one source to the next, Reid continued.

"ESS is not a traumatic revolution," Reid said of putting terminals on the desks of senior management. "The time and technology is right. It's not a systems process, it's a people process."

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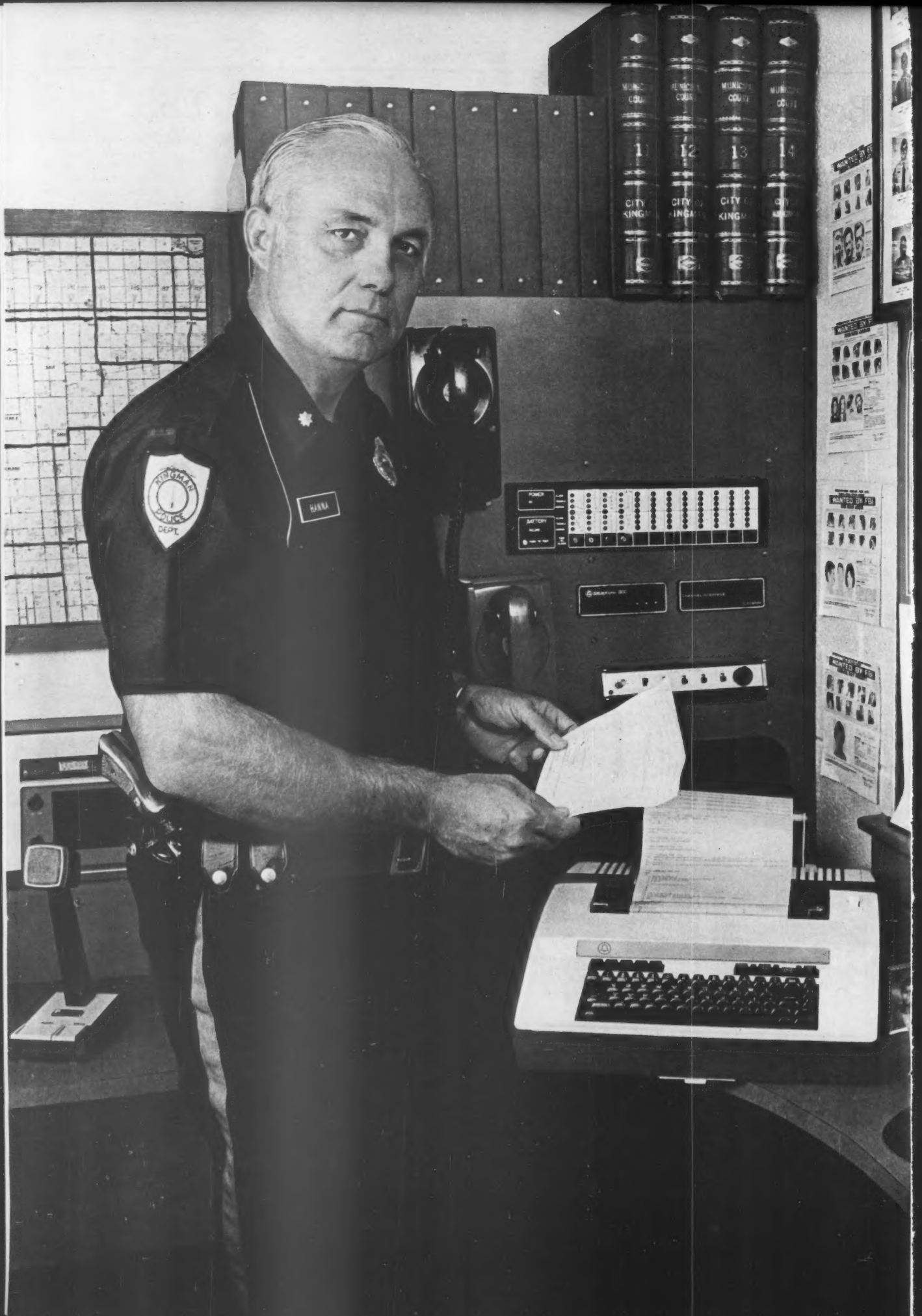
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Best DSS Save Managers' Time, Assist Their Judgment, Exec Says

By Bruce Hoard
CW Staff

NEW YORK — A good decision support system (DSS) should assist managerial judgment in unstructured tasks and increase the amount of time managers have to apply toward areas they excel in, Dr. M.C.A. van Nievelt said here recently.

Speaking at the ninth annual International Information Management Exposition and Conference, the director of Nestle Corp.'s management services said today's managers want complex, analytical, on-line tools more than ever before. If such tools are available in the form of DSS, managers will understand their businesses better, gain job satisfaction

and have more time for analytical thought, he said.

Van Nievelt traced the history of DSS to work done by Harvard University's Herbert Simon, who won the Nobel Prize for Economics in 1978. He said Simon defined an unstructured task as a "do-it-yourself task" that cannot be assigned to another person. Conversely, structured tasks can be performed by someone else if proper planning has been done.

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Three Levels of Workers

Van Nievelt said another Harvard professor, Robert Anthony, furthered the evolution of DSS in a 1965 article that layed out three levels of workers and their varying information needs. At the top level, Anthony placed employees who plan the future and require high-level aggregate-type data.

Workers in the middle level were charged with seeing that top-level plans and resources were implemented successfully. They required more precise data than the top-level employees. The bottom category of workers in Anthony's model were concerned with past and present problems and dealt with very precise, tangible data.

Some factors required in present DSS include interactive information tools in the form of large, shared systems. Personal computers do not currently fit that definition, although they may be used as terminals in such systems, the director observed.

Addressing the man-machine interface, he said graphics is very important to DSS because it helps contain information overload and indicates trends.

In comparison to DP systems, DSS is flexible, effective and user-oriented, while DP systems are repetitive, efficient and machine-oriented, he said.

Van Nievelt warned his audience that it should not underestimate the training workload associated with DSS, saying manuals and classrooms are not enough. He favors computer-assisted instruction for training.

He underscored the importance of DSS by pointing to the results of a study on response time indicating a strong relationship between machine response time and user response time. "Response time directly affects user productivity," he said, backing his claim by referring to a graph indicating a 55% decay in short-term human memory over five seconds. Longer machine response time leads to more user mistakes, he said.

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Study Sees Better Time Use With Voice, Electronic Mail

By Bruce Hoard
CW Staff

NEW YORK — A recent study performed by Arthur Andersen & Co. for a \$1.8 billion company showed managers and secretaries in that client company were spending excessive time on tasks that could be done by voice mail and electronic mail.

Robert I. Baxter, manager of the Management Information Consulting Division with Arthur Andersen and Co., discussed the study during a session at the ninth annual International Information Management Exposition and Conference here recently.

Conducted from September 1981 to January 1982, the study surveyed 1,100 professionals and secretaries who were moving into a new campus-like set of buildings. Baxter limited his comments to one division with 238 managers and 58 secretaries.

He said the study found that the professionals spent 21% of their time in communications, most of which involved telephone conversations; 18% on "documents," which consisted of longhand writing; and 15% with administrative functions.

Secretaries were found to spend 35% of their time typing and 42% in routine support such as telephone calls and filing. Baxter said that when his company saw those numbers, it felt voice and electronic mail could be applicable to the client company.

The study also found that the accuracy of the firm's centralized word processing centers' proofreading was abysmal; managers considered typ-

ing and telephone calls to be the most valuable support functions performed by their secretaries; and managers thought there were not enough secretaries and that the work load on secretaries was too heavy, according to Baxter.

Asked which tasks they would delegate if more support was available, managers pointed to photocopying, filing and proofreading. Baxter cited this as further evidence that professionals were spending too much time on secretarial functions.

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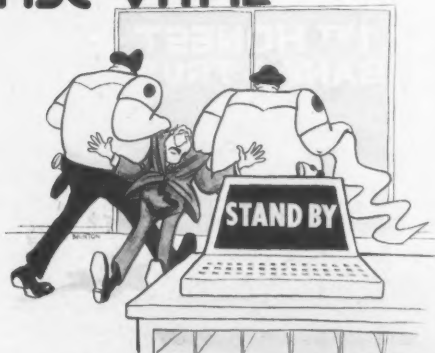
He said voice mail loomed larger as a possible solution to the company's communications needs when it was discovered that secretaries spent 5,670 hours yearly taking phone messages. The manager added that there could be considerable savings if even 50% of those messages were taken care of with voice mail.

The managers studied were found to be spending 47,000 hours annually composing messages, at least 11,000 of which were spent on messages for internal distribution. Baxter said that a voice mail system could save significant money even if only 5% of those 11,000 hours were eliminated by voice mail.

As a result of the study, he said a successful voice mail pilot project was conducted, followed by the purchase of a system.

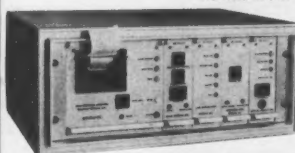
Baxter also discussed savings the client company could realize through the use of electronic mail, saying the time secretaries spent opening and delivering mail could be pared considerably.

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Consultant Details 'Five Ws' of Needs Analysis

By Bob Johnson

CW New York Bureau

NEW YORK — Performing needs analysis for the automated office would seem to be a simple task — define the needs and get the hardware and software to fill them. But according to a speaker at the ninth annual International Information Management Exposition and Conference here recently, needs analysis takes more than plain common sense.

In a presentation on "How to Perform Needs Analysis," Joseph Gallagher, senior consultant at Price Waterhouse & Co., suggested breaking functions into what he called the "Five Ws" as one approach to needs analysis. Ask who will perform the function; what types of equipment will be needed; why it is needed; when it is needed; and where acquisitions will be effective, he counseled.

Explaining the first area, Gallagher told attendees that the choice of who would act as decision maker usually was one of three people — the office department manager, an internal company consultant or an outside consultant hired on a contract basis.

Advantages

The advantages of having the department manager analyzing office needs is that he is likely to be familiar with the overall operation and the people who are involved in it. This insight can prove valuable when considering the multitude of vendors in the field and the myriad choices available, Gallagher explained.

The disadvantage posed by the department manager is that he is often new to needs analysis. More importantly, Gallagher pointed out, if the needs of an office stem from poor management rather than poor resources, the manager may not have the necessary objectivity to make correct decisions.

Internal consultants offer good company experience in performing the analysis, Gallagher stated, but their exposure to certain company ar-

eas may be limited. He added that the internal consultant is often at the mercy of company politics and users may have to wait in line before they get what they need.

The external expert has a broad range of experience and greater objectivity and will finish the project in a specified time period, Gallagher maintained. The obvious disadvantage is that these people are usually more costly. The speaker suggested that a combination of internal and external expertise might be the best alternative.

Discussing the second area on what is needed, Gallagher maintained that the most important aspect to consider when choosing a system is whether it meets the needs of the company

and achieves the desired goals. "The person doing the analysis must realize that needs analysis involves many components, not just technology. In some cases, new equipment is not the answer; what is really needed is the question," he said.

The "why" question appears ludicrous, Gallagher acknowledged. However, it points out the difficulty some users have in discovering the real solution to their needs problem. Similar to the question of what is needed, why something is needed may seem immediately transparent but can actually fool the user, the speaker noted.

One of the more important things to consider when defining needs is when will the plan take place.

"Shortly before the budget is made or before a major move are both good times to begin a needs analysis. New storage and new layouts can help in making a decision," Gallagher said. In addition, the period right after some new technology is installed is a good time for needs analysis, according to Gallagher, because it frees up the technical staff and gives an opportunity to see if there are any bottlenecks in existing systems.

Concluding with where things are needed, the consultant said that the five function areas of the office — data creation, storage and retrieval, reproduction, distribution and communication — must be considered to give an accurate view of what and how needs will be added.

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The \$35,000 fellowship will be presented to an individual who has made an important and lasting contribution to communications science or technology. The recipient is invited to develop creative work that will add to knowledge and understanding of the science of communications.

Nominations should include a one-page statement of reasons, a full biography and list of publications, three letters of support and three names and addresses of independent references. Self-nominations will not be considered, a spokesman said.

The deadline for entries is April 15; the recipient will be selected the following October. Nominations should be submitted to 333 Jay St., Brooklyn, N.Y. 11201.

Ergonomics and the Automated Office: Expert Claims Staff Overlooked in OA Moves

By Bob Johnson

CW New York Bureau

NEW YORK — Too little attention is being paid to the people who are working in today's technology-driven office environment, according to a human factors expert who spoke at the ninth annual International Information Management Exposition and Conference here recently.

Wilbert Galitz, president of Galitz, Inc., said in a session on "Integrating Technology With Human Factors in Office Systems — How to Avoid Costly Mistakes" that the industry must realize that successful office systems will have to be designed with a harmonious people/technol-

ogy interface in mind.

When a change occurred in the office environment in the past, time was given for everyone to adapt to it and to settle down into a comfortable state. Now, with technological changes entering the office at a dizzying speed, the need to adapt is continual, Galitz said.

"Changes to office procedure in the past had precedents which could be followed in order to adapt. Today, only a few of these precedents can be applied in order to guide the worker," he said.

As office automation progressed, Galitz said, the industry did not provide a smooth trail for the people

working in it. Users began to develop symptoms of system rejection because of difficulty in using the system and because of health problems, both of which still exist.

"We are now at the crossroads. The industry will either be responsive to human needs or continue the way it's been going," Galitz said. "If it doesn't change, we are going to see a mechanized environment similar to the manufacturing industry with all of its inherent problems."

New User Breed

Human factors are important today because a new breed of user has emerged in the last 10 years, accord-

ing to Galitz. A few years ago, most systems were manned by dedicated users who had a single, repetitive task to do. Today, the user is more discretionary and can reject technology with which he does not feel comfortable or which does not help in his job.

There has also been a change in the people-to-hardware cost ratio, Galitz added. "People costs used to be 10% to 20% of systems costs. Today, people account for some 80% to 90% of the budget."

This is positive because, with the concentration on user enhancements, system productivity is sure to increase, he said.

Galitz stressed that there are definite concerns that must be addressed in office automation if human factors are to be satisfactory. One is the combination of health hazards and ergonomic difficulties that system operators face. He said recent research has shown that eye strain, postural problems and ion imbalances, among other things, are having negative effects on these operators. He maintained that systems or surroundings contributing to these hazards must be changed.

Galitz warned that bad system design could result in rejection by the user, misuse of the system or only partial use of it, causing ineffective productivity.

Another major area of concern in integrating technology with humans is the lost job problem. Galitz said office automation that puts people out of work could be counter-productive in the long run. He added that the assumption that office automation will create different jobs, as data processing did, cannot be applied in the clerical world.

Similarly, degradation in the quality of working life — lost skills, absence of social interaction and limited participation in decision making — also poses problems when people interact with automation, according to the speaker.

Galitz offered some solutions to these problems. He said proper planning for office automation should be done before any system is installed. In addition, top management support should be acquired.

Implementation of new systems should proceed at a slow pace, Galitz said. "Proceed in small steps, limit the technological advances and focus on the potential for success which the system is capable of," he advised.

Bunker Ramo Starts Courses on Unix, C

TRUMBULL, Conn. — Bunker Ramo Information Systems, a division of Bunker Ramo Corp., has started a series of software courses.

The first four courses are "An Introduction to Unix," "Advanced Unix Methods," "Programming in the C Language" and "Advanced C Methods."

Courses will be held at the firm's training center here. Each course requires one week to complete and costs \$600. Further information is available from Bunker Ramo, 35 Nutmeg Drive, Trumbull, Conn. 06609.

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Firm Finds Conversion Painless With Package

By Susan Blakeney
CW Staff

DALLAS — The group insurance business of a firm here was painlessly converted from batch to on-line with the help of an application development software package.

This was the word from Gary Nelson, a senior programmer/analyst at Maccabees Mutual Life Insurance Co. in Detroit, who attended Pansophic Systems, Inc.'s recent Pansophic Users Learning and Sharing Exchange conference here.

Nelson's firm is using the newly acquired Pansophic Management Information System/On-line (MIS/OL) for on-line application development for CICS.

Used in conjunction with the com-

pany's Cullinane Database Systems, Inc. IDMS data base management system, MIS/OL has enabled Maccabees Mutual Life to implement successfully its Magic project (Maccabees Automated Group Information and Control system), which is what it is calling the conversion of the group insurance business from batch to on-line.

"It was a pretty easy transition as far as the staff is concerned," claimed Nelson.

He went on to say that billing and underwriting portions of the company's operations are now going on-line with MIS/OL.

"The ease and flexibility of the screen building enables us to check the format of the screen every easily.

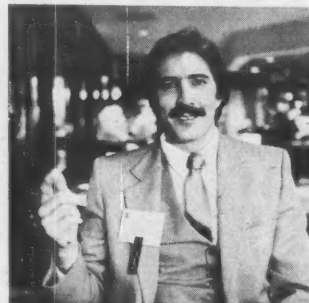
The dictionary portion of MIS/OL relieves some of the rudimentary edits that a normal Cobol program would have to do.

"With MIS/OL you can indicate whether a field is mandatory as input ... and you can have the dictionary edit for valid values," Nelson maintained.

As for expanding his company's usage of the product, Nelson admitted that "It looks like MIS/OL has a lot more potential uses ... and I'm looking forward to using them."

"You can use MIS/OL and develop on-line applications without having a CICS resident expert," Nelson explained.

At Maccabees, MIS/OL is used on the firm's two IBM 370/178 main-



CW Photo by S. Blakeney

Nelson is using MIS/OL for on-line application development for CICS.

frame computer systems and performs the I/O mapping of the screens, data and dictionaries.

Pansophic's MIS/OL was obtained from Planning Research Corp. this past summer. "The results of this have been very positive ... the support seems to be improving and enhancements are being promised for January," Nelson said.

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State Tests Retrieval Package

DALLAS — Two attendees at Pansophic Systems, Inc.'s recent users group meeting here described how Nebraska became a beta test site for Pansophic's Pro/grammer information retrieval and application development software in 1981.

Allen Watsek, former project manager of systems and computer technology with the Nebraska DP center in Lincoln, and Fred Lupher, the state's senior analyst, said that their office operates like a service bureau. It handles the data processing for all state agencies, including the department of revenue, motor vehicles, education, welfare, game and parks and real estate.

According to Watsek, Pro/grammer was easy to learn, coming from an Easytrieve (another Pansophic software product) background. They use Pro/grammer on the state's IBM 3033 system for the myriad of reporting required by the various state agencies.

"It's much easier to use that Cobol — with less code," maintained Lupher. "We've realized time savings upwards of 50% with it." Lupher explained that object code does not have to be regenerated with every execution, unlike with Easytrieve.

"It's not just a retrieval and reporting product — it can be used anywhere in batch operations — it can be used to develop a complete batch system," Lupher said.

Watsek believed that Pro/grammer's versatility and flexibility will eventually sell itself and predicted that once people start using it, "they won't go back to Cobol."

The one and only complaint Watsek voiced about Pro/grammer was about the product's name. One day, he recalled having to ask a member of his staff, "Have you got your Pro/grammer program programmed?" As an alternative he suggested PAL — Pansophic's application language.

End Users Want Analysis Info Center Concept Seen Growing

By Susan Blakeney

CW Staff

DALLAS — End-user management wants to analyze data as well as process it. This is the reason for the current surge of interest in the information center concept, according to Chet Mills, president of Dialogues Research Services (DRS) here.

Mills made this claim during a speech at Pansophic Systems, Inc.'s recent users meeting here. Mills maintained that the information center concept includes seven major components.

First on the list was the development of a need for an information center. He suggested that end users now "really believe" that automation can contribute to their business successes. They also need access to their information immediately. Couple these factors with the proven productivity gained through automation and favorable computing economics and you have established a need, Mills argued.

"Demand-creating factors" followed these points in Mills version of the information center concept. Expanded availability and utilization of on-line systems must be considered, he said. With remote computing facilities now an economic feasibility, end users are provided with previously unheard of analytical processing power.

Equipment Options

Alternatives in information center equipment were enumerated as the third component. "You can start with large-scale on-line [IBM] 3270-based systems, microcomputers, personal computers, specialized on-line analytical workstations and integrated workstations," according to Mills. Given the current influx of micros, he claimed, "most information centers start up unbeknownst to DP."

Next, a corporate strategy or charter for the information center was discussed. "Establish what kind of information center you want," Mills stressed. "Ask yourself if you want a production application system type, or a scientific and engineering analytical type or a decision support system information center before you go shopping for software," Mills urged.

The software evolution was the fifth item on Mills' information center concept outline. He suggested that the current availability of analytical software for smaller systems, macro-based processing languages, high-level language capabilities and

friendly interfaces have given new, previously unavailable power to end users.

User fulfillment was the sixth consideration. Initially, people are usually very happy with an information center, but at 12 to 15 months they are only fairly satisfied because they often reach the extent of their capability, he said. To ease this backlash,

Mills advised better corporate planning, in the range of 3 to 6 months, and the appointment of an information center manager.

Lastly, Mills examined some typical management experiences with the information center. He said that a 1:10 staffing ratio in an information center works best, the selection of the right

software is critical and difficulties with data communications are still "the weak link" in information center strategy. "Bite the SNA bullet," was Mills' advice.

In summation, Mills encouraged his audience, mostly comprised of DPs, not to compete with the information center, but rather, "dig your heels in."



CW Photo by S. Blakeney
Chet Mills



Dear Ma: Racal-Vadic's new Error Controller can reduce data communications errors to one in every 37 years!

99.999% Accuracy

Data transmission over a 2400 bps telephone line can result in an error a minute. Install Racal-Vadic's VA845E and VA855E controllers and errors can be reduced to as few as one every 37 years. Incredible, Ma, but true.

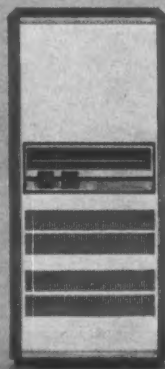
You see, Racal-Vadic's error controllers detect better than 99.999% of all possible errors and correct them with an Automatic Request for Retransmission of Data (ARQ).

Completely Transparent

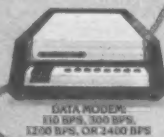
These low-cost, full-duplex units operate at 110, 300, 1200, and 2400 bps. They are completely transparent so users do not have to alter operating procedures or software. The error controllers pass 7-bit codes with or without parity, and 8-bit codes as well. Just plug them into your system using a standard RS232C interface and begin error-free communications.

Remote and Central-Computer Site Packaging

The VA845E is designed for central-computer site use. It's packaged on a single PC board that fits inside Racal-Vadic's 7-inch-high rack-mount chassis. For remote-terminal use, specify model VA855E with its new, super-low profile, desktop cabinet.



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Michael L. Douglas

MICHAEL L. DOUGLAS has been promoted from senior vice-president to executive vice-president at the First National Bank of Louisville in Louisville, Ky. He remains in charge of operations and data processing management.

In 1963, Douglas joined First Kentucky Trust Co., an affiliate of the First National Bank of Louisville. He became vice-president for investment management operations in 1974 and was named manager of data processing and operations of First National Bank in 1979.

During his career, Douglas has been responsible for automation of both personal trust and stockholder accounting, development of master trust services and has held overall responsibility for data processing activities. Currently, he assists in the development of business strategies utilizing technology to improve productivity and customer service levels.

He attended Indiana University Southeast.

...

DAVE OMTVEDT has been appointed manager of data processing and TOM BURKE has been named director of information systems for Technical Publishing Co., a company of Dun & Bradstreet Corp., headquartered in Barrington, Ill., which publishes business magazines, specialized consumer books and educational training systems.

Omtvedt assumes responsibility for all data processing production functions of

Technical's Information Services Department. Formerly an employee of Honeywell, Inc., Omtvedt joined Technical Publishing in 1974 as a computer operations supervisor. He was promoted to manager of data processing operations in 1977.

Burke joined Technical Publishing in 1970 as a programmer, before his promotion in 1974 to manager of systems & programming. He

graduated from the University of Illinois with a B.S. degree and received an MBA degree from the University of Chicago.

...

PAUL C. MESSINA has been named director of the new Mathematics and Computer Science Division at the Department of Energy's Argonne National Laboratory

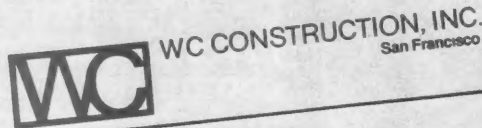
in Argonne, Ill. His promotion follows four years as associate director of the former Applied Mathematics Division and head of Applied Mathematical Sciences.

Messina joined Argonne in 1973 as a computer scientist and leader of user services in the Applied Mathematics Division, a position he held until 1978. During that time he was responsible for providing various services to users

of Argonne's central computing facility.

He received his B.S. degree in mathematics from the College of Wooster, Wooster, Ohio; and an M.S. degree in applied mathematics and a Ph.D. in mathematics from the University of Cincinnati. Messina has been chairman of the Department of Energy Advanced Computing Committee Language Working Group since 1979.

Managers on the Move



Office Memo

Date: November 10, 1982

To: Jack Burns, Division Manager
From: Tom Donohue, President
Subject: Computer recommendations

Your purchase request for six personal computers just reached my desk.

What gives?

I thought you understood our growth plans, Jack, but the computers you've recommended are dead ends. They might do the job today, but what about tomorrow? They don't connect together to form any kind of functional system. The 8-bit models aren't compatible with the 16-bit models. And I doubt the software that runs on the computers you want will be of any use later when we're forced to buy computers that work together.

You saved us a little now, Jack, but your decision will cost us a bundle as we grow into the future. We are growing, Jack, and I'm sure that you want to be part of that growth.

See me before you go home tonight.

Tom

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In Defense of DP Communication

Q I am writing to rebut your reply to a person who complained about the inevitability of corporate politics which, as he sees it, disrupts his ability to be an effective technician. Your reply essentially acknowledged the appropriateness of the person's complaint.

I believe that the writer's attitude (which is representative of the attitudes of

other computer professionals) is somewhat immature. It fails to recognize the need for people-to-people communication in the operation of a major department or company.

The process of building and installing systems (especially large ones) requires close communication among individuals with a variety of backgrounds. This communication, which

often takes place between people with different points of view and different expertise, is essential to success in the systems business. This communication must include the establishment of working relationships and maintenance of open communication channels between people.

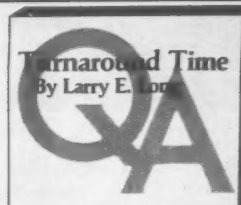
To be sure, there are many instances in which personal motivations and other inap-

propriate factors enter into the process.

The attachment of the label "politics" to all instances of communication and issue resolution is, however, incorrect.

Your reply to this person's letter essentially acknowledged the appropriateness of his attitude.

You counseled him on the criteria for proper choice of his next employer (his sev-



enth job in six years). This person needs counseling in other areas as well. Specifically, he must learn about "politics" vs. "communication" and about the need to work with, communicate with and get along with other people in his job.

He needs to be counseled that a job change whenever he becomes unhappy with decisions that are made (for reasons he is unaware of or not in agreement with) is immature and ruinous to his career.

In my years in this field, I have met many individuals whose attitude about corporate politics is as narrow and shortsighted as that of the correspondent.

Part of the solution to the perennial turnover problem is greater maturity on the part of individual employees.

A The correspondent to whom you referred disdained "people-work" largely because of the political games that people play.

Given the proper environment, a good programmer can work directly from detailed specifications with minimal interaction with others.

In no way did I intend to downplay the importance of interpersonal communication, nor did I intend to equate politics with communication.

Your letter has some good points that need to be reemphasized periodically. However, I do not agree that the original correspondent's attitude is representative of other computer professionals. We still have our communication problems. I see evidence of the recognition of the importance of effective communication by both computer professionals and users.

This recognition is the beginning of a trend to create quality information systems.

Long, president of Long and Associates, is a consultant, lecturer and author in the field of information services. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

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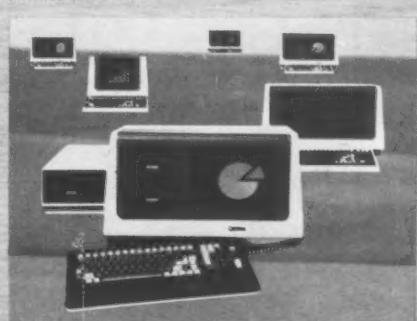
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Capt. Hopper to Keynote Women in Computing Meet

DALLAS — Capt. Grace Hopper will be the keynote speaker at the second annual Women in Computing seminar here, which will be held Nov. 8.

Other speakers will include Charles Feld, director of management services at Frito-Lay Corp., who will discuss integrating data processing systems and information capabilities into corporate planning. Karen Stewart, vice-president of development at the Harvard Human Resources Group, Inc., will speak on effective communications.

Registration for the seminar costs \$55 for members, \$70 for nonmembers and \$45 for students before Oct.

27. After that date, registration costs \$70, \$95 and \$60, respectively. The organization can be reached at Suite 185, 2701-C W. 15th, Plano, Texas, 75075.

Institute Offers Unix, C Courses

CAMBRIDGE, Mass. — The Institute for Advanced Professional Studies will sponsor a series of workshops on the Bell Laboratories Unix operating system and C programming language.

The next publicly offered courses include:

- "Introduction to Unix," costing \$575 and offered Oct 25-27 at the firm's Cambridge headquarters and Dec. 1-3 at the Rosslyn, Va., Holiday Inn.

- "The C Programming Workshop," \$845, scheduled Nov. 15-19 at the firm's headquarters in Cambridge and Dec. 6-10 at the Rosslyn Holiday Inn.

- "Unix System Administration," \$400, Oct. 28-29 at the Cambridge headquarters and Dec. 13-14 at the Rosslyn Holiday Inn.

More information is available from the institute at 55 Wheeler St., Cambridge, Mass. 02138.

Calif. DP Group To Meet Nov. 4

SAN DIEGO — The California Educational Data Processing Association will hold its annual convention Nov. 4-5 at the Hotel Del Coronado here.

With the theme of "Micro vs. Maxi, Act II," the convention will address the use of computers in education, information resource management, office automation systems, educational support systems and connectivity.

William P. Conlin, senior vice-president of Burroughs Corp. and president of industry systems, will be the keynote speaker.

Registration is being coordinated by Jane Householder at the Office of the Los Angeles County Superintendent of Schools, Data Processing Division, 9300 E. Imperial Highway, Downey, Calif. 92042.

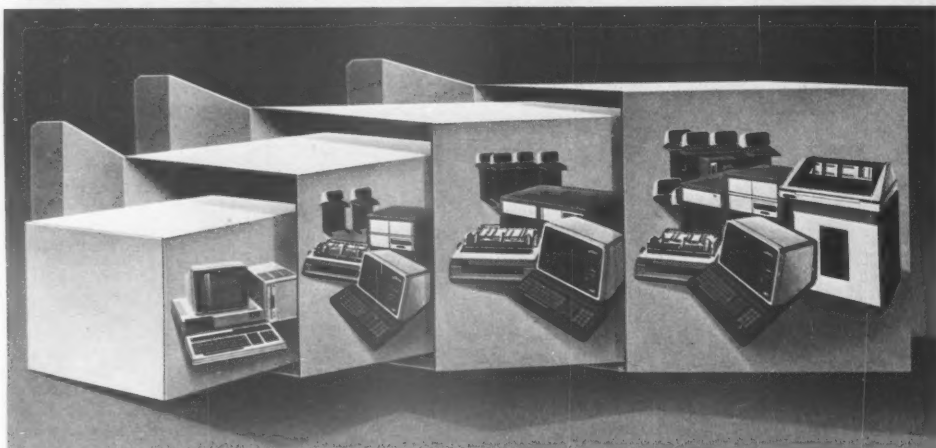
Info Systems Guide Gets Fifth Revision

DETROIT — Gale Research Co. has released the fifth edition of the *Encyclopedia of Information Systems and Services*, an international guide to computer-based information systems and services.

The new edition contains over 2,500 entries. Each entry furnishes up to 17 categories, including addresses, contacts, description of systems and services and publications.

Among the 23 indexes included is a master name index to all organizations, systems, services and products.

The guide will be available in November for \$250 from Gale Research Co., Book Tower, Detroit, Mich. 48226.



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Oct. 31-Nov. 3, Barcelona, Spain — **Integrating Payment Systems: A European Perspective.** Contact: Payment Systems, Inc., 100 Peachtree St., Atlanta, Ga. 30303.

Nov. 1-2, New York — **Evaluating Decision Support Software: A Managerial Perspective.** Contact: DSS Conference, 215 First St., Cambridge, Mass. 02142.

Nov. 3-4, New York — **Disaster, Backup and Recovery Techniques.** Contact: Minstor Systems Corp., Sunnyvale, Calif. 94086.

Nov. 4-5, San Francisco — **IBM's Systems Network Architecture: A Master Plan for Teleprocessing.** Contact:

Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 4-5, Chicago — **Networking, Protocols and Standards.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 4-5, Washington, D.C. — **Software Engineering Economics.** Contact: Education Foundation of the Data Processing Management Association, P.O. Box 91295, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

Calendar

Nov. 4-5, Chicago — **Enhancing End-User Satisfaction through the Information Center.** Contact: Performance Development Corp., 1101 State Road, Building N, Princeton, N.J. 08540.

Nov. 4-5, St. Louis — **Computer Graphics/Microprocessor Personal Computer Systems.** Contact: Association for Educational Data Systems, 1201 16th St. N.W., Washington, D.C. 20036.

Nov. 4-5, Washington, D.C. — **Software Engineering Economics.** Contact: Data Processing Management Association Education Foundation, Suite 1016, 5959 W. Century Blvd., Los Angeles, Calif.

Nov. 4-5, Worcester, Mass. — **Microcomputers in a Small Business.** Contact: Elaine McCormack, Central New England College, 768 Main St., Worcester, Mass. 01610.

Nov. 5, Fairfax, Va. — **Management Responsibilities in the DP Industry.** Contact: John Prescott, Shramm Associates, 105 Rowell Court, Falls Church, Va. 22046.

Nov. 6, San Diego — **Third Annual San Diego Computer Conference.** Contact: Software Systems Unlimited, P.O. Box 85152 MB252, San Diego, Calif. 92138.

Nov. 6-7, New York — **CICS Internal Architecture Intensive.** Contact: Sys-Ed, One Park Ave., New York, N.Y. 10016.

WEEK OF NOV. 7

Nov. 7-9, Albany, N.Y. — **The 17th Annual Conference of the New York State Association of Educational Data Systems.** Contact: Gary Bruce, Program Chairman, 55 School St., Delevan, N.Y. 16042.

Nov. 7-9, San Francisco — **UCSD Pascal System Conference.** Contact: Somerset & Associates, Suite 300, 111 Anza Blvd., Burlingame, Calif. 94010.

Nov. 7-10, Houston — **Data Training '82.** Contact: Data Training, 176 Federal St., Boston, Mass. 02110.

Nov. 8, St. Louis — **The Certificate in Data Processing — Is It for You? Contact:** The Education Foundation of the Data Processing Management Association and Local Chapters, P.O. Box 23013, Jacksonville, Fla. 32216.

Nov. 8-9, Houston — **Magnetic Tape Library Management Seminar.** Contact: Tape Library Consulting, 3 Rock Royal Road, Yardville, N.J. 08620.

Nov. 8-9, Toronto — **Data Communications I-Basic Concepts.** Contact: Business Communications Review,

950 York Road, Hinsdale, Ill. 60521.

Nov. 8-9, Los Angeles — **Robotics and Artificial Intelligence.** Contact: Technology Transfer Society Seminars, P.O. Box 91295, Suite 1016, 5959 W. Century Blvd., Los Angeles, Calif. 90009.

Nov. 8-9, New York — **CICS/VS Audit and Controls.** Contact: Teltech, 548 Fifth Ave., New York, N.Y. 10036.

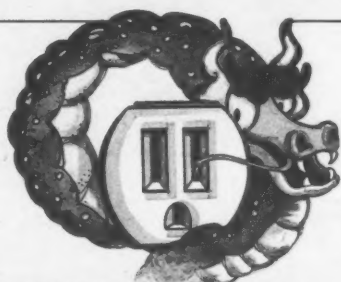
Nov. 8-9, Washington, D.C. — **KU-Band Satellite Communications in the '80s.** Contact: Stacey Schallon, Seminar Coordinator, Phil-

lips Publishing, Inc., Suite 1200 N., 7315 Wisconsin Ave., Bethesda, Md. 20814.

Nov. 8-9, New York — **Computer-Aided Space Design & Management Conference.** Contact: Gralla Conferences, 1515 Broadway, New York, N.Y. 10036.

Nov. 8-10, New York — **Computer-Aided Architectural Design.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 8-10, Chicago — **DP Project Management: A Practical Approach.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.



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ACU's Kurihara Elected Software Commission Names Head

WASHINGTON, D.C. — The Commission on Software Issues in the '80s recently announced the results of its annual elections.

Thomas M. Kurihara, representative to the commission from the Association of Computer Users, was elected commission chairman for the next year. He is an active member of the American National Standards Institute Committee X3, information systems, and the X3 Standards Planning and Requirements Committee. He also worked with the commission's Task Force on Software Standards.

Former chairman Daniel T. Brooks was elected vice-

chairman as well as chairman of the Task Force on Software Protection. The secretary of the Software Commission is Jose-Marie Griffiths, who represents the American Society for Information Science.

Dr. Elisabeth F. Mullen, representative of the Association for Women in Computing, will serve as treasurer. Mullen is managing partner of JEM Associates, a software firm specializing in software for the retail industry.

Elected chairman of the Task Force on Education and Training of Software Professionals was Dr. Richard H. Austing, professor of computer science at the Universi-

ty of Maryland. Lawyer J.T. Westermeier Jr., who represents the Data Processing Management Association on the commission, will continue to serve as chairman of the Task Force on Taxation.

The Task Force on Standards will continue to be chaired by Nander Brown Jr., commission representative of the EDP Auditors Association, who is assistant general auditor for the Federal Home Mortgage Corp.

Further information can be obtained by contacting Mullen at 459 Carlisle Drive, Herndon, Va. 22070.

'Aura' Hits Top 30 List

ARGONNE, ILL. — A general-purpose reasoning program that has assisted in designing electronic circuits, detecting flaws in other computer programs and solving mathematical problems has been listed among the top 30 achievements of the year by the Department of Energy's Office of Basic Energy Sciences.

The program, called Aura, was developed at the Argonne National Laboratory, which is operated by the University of Chicago for the U.S. Department of Energy.

Aura reportedly allows a scientist to define a problem using a special input language. Aura employs advanced logic to solve the problem without testing all possibilities. The user can interact with Aura to suggest paths of inquiry to investigate.

Speakers Sought For MIS Meet

FRAMINGHAM, Mass. — MIS Training Institute, Inc. is seeking people to give presentations at technical sessions for its Third Annual Conference on Control & Audit of IBM Systems, to be held in New York in 1983.

Suggested topics include, but are not limited to, the audit, control and security implications of networks, System/34, System/38, 8100 series, DOS/VSE, VSPC, Series/1, on-line systems, data base systems, SMF, SAS, access control software, accounting routines, production control, librarian software, VM/CMS, personal computers, TSO, SPF, disaster recovery and performance evaluation.

A brief abstract of the proposed topic should be submitted to Michael I. Sobol, MIS Training Institute, 4 Brewster Road, Framingham, Mass. 01701.

DBMS Meeting Set for '83

LYNNFIELD, Mass. — The 1983 National Data Base Management Symposium, set to focus on new data base management systems (DBMS) products, will be offered in Los Angeles from March 1-4, in Washington, D.C. from April 18-21 and in Chicago from May 16-19.

Sponsored by Digital Consulting Associates, Inc. here, the symposium will stress high-level application generator languages, data base design aid products and user-oriented DBMS capabilities.

Conference registration is \$650 for all four days or \$350 for the first-day seminar on software packages and DBMS models. Digital Consulting is located at 5 Kimberly Terrace, Lynnfield, Mass. 01940.

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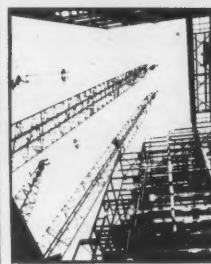
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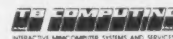
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Survey Reveals Just Two 'Top Rated' Packages

(Continued from Page 1)

separately priced software. Of these, 549 (18.3%) indicated they obtained software from their computer vendor alone; 470 (15.7%) said they use only independently supplied software; and 1,936 (64.6%) reported that they use software supplied by both independent vendors and by their computer vendor.

The Datapro survey results were based on 3,000 returns in which the respondents evaluated at least one software package (Figure 3). A total of 3,963 software package ratings were made by the 3,000 respondents. The survey form only requested up to two package ratings; 2,036 of the respondents rated one package and 964 rated two.

Datapro explained that the packages were rated by users on a scale of one to four with four representing "excellent," three equaling "good," two equaling "fair" and one equaling "poor." These ratings were used to calculate a mean average user ratings and cluster analysis (Figure 4; see story on Page 40) for each of the following nine attributes:

- Reliability.
- Efficiency.
- Ease of Installation.
- Ease of Use.
- Vendor's Technical Support.

Money Saved With Packages

DELRAN, N.J. — One hundred percent of respondents to Datapro Research Corp.'s 1982 "User Ratings of Proprietary Software" survey indicated that the use of packaged software rather than homegrown solutions is saving them money.

This was in response to a survey question in which the 3,000 survey participants were asked whether they saved money, broke even or lost money by installing the software package they were rating.

Asked if the packages performed as the vendor promised, the majority of respondents (84.6%) said "immediately." Another 36.9% said "eventually," and only 4.9% checked "never."

The overwhelming majority of the survey respondents (78.2%) reported that no modifications were required. Another 23.9% indicated that the vendor made some modifications, and 32.5% said modifications were made by the user.

Of the 28.7% of the respondents who said they paid for modifications, 10.6% reported spending under \$2,000 for these modifications; 9.2% said they spent between \$2,000 and \$10,000; and 8.9% indicated they spent over \$10,000.

"Saving human resources" was rated highest in advantages of the software packages being rated by 98.3% of the respondents. The second highest rated advantage was flexibility, listed by 85.3% of the respondents. The most frequently listed disadvantage of the software packages being rated was "complexity," which was reported by 33.8% of the respondents. "Uses excessive resources" was next in line for 27.3% of the respondents.

- Troubleshooting.
- Documentation.
- User Education.
- Vendor's Maintenance.
- Overall Satisfaction.

The survey contains detailed package ratings for each of the 62 proprietary software packages that were rated by the respondents.

A report titled "User Ratings of Proprietary Software — Complete" contains user ratings and cluster analyses of all 257 software packages that received three or more responses in the survey. It is available from Datapro for \$25.

Further information about this report and about the software survey in general can be obtained from Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

	1981	1982	1983
Number reporting expenditure	1,328	1,408	939
Percent reporting expenditure	44.3	46.9	31.3
Total dollar expenditure	\$129,710,000	\$132,038,000	\$153,321,000
Average dollar expenditure	\$97,673	\$89,215	\$163,281
Median expenditure	\$20,000	\$20,000	\$29,000

Source: Datapro

Figure 2: Expenditures for Software Packages

	Total	Mail	Telephone	Percent of effective sample
Returns received with at least one software package evaluated	3,000	966	2,034	30.5
Returns in which general questions were answered—no software package evaluated (do not use separately priced software, non-users, software package evaluation does not apply to them)	2,274	433	1,841	23.1
Returns received from vendors who rated their own packages (not included in package ratings)	54	54	—	0.5
Total questionnaires and interviews completed	5,328	1,453	3,875	54.1
Non-respondents	4,526	—	—	45.9
Post Office returns	71	—	—	—
Total	9,925	—	—	100.00

Datapro Chart

Figure 3: Summary of Survey Returns

Datapro Survey Results Based on 3,000 Responses

DELRAN, N.J. — Obtaining the 3,000 responses on which its "User Ratings of Proprietary Software" survey results were based was a long, involved process for Datapro Research Corp.

First, approximately 9,925 names were selected from the Computerworld subscriber list. The survey sample was selected by Datapro on an "nth" name basis from several job titles and function categories represented by CW's circulation.

The categories included Director, Manager and Supervisor of Data Processing Services; Systems Manager and Systems Analyst; and Manager or Supervisor of Programming.

The first survey mailing was made May 19. A second mailing was made June 21 after the names of respondents to the first mailing were removed from the list, Datapro noted.

According to Datapro, a target response of 50% was set in order to ensure reliability of the results consistent with previous surveys of this type. Because response to the mail survey was disappointing, telephone calls were made during July and August to

those individuals on the list who did not respond to the mail survey.

A total of 5,328 returns were received from both the mail and telephone data gathering efforts (Figure 3 above), resulting in a response of 54.1%. Of these returns, 3,000 included an evaluation of at least one software package. These 3,000 respondents formed the basis for the survey evaluation results.

The questions dealt with budgetary information as well as specific packages. Some of the latter questions concerned whether the package performed as the vendor promised and if it required modification.

Ratings Formed From Means, Clusters

DELRAN, N.J. — The 1982 Datapro Research Corp. "User Ratings of Proprietary Software" employed cluster analysis of the software user ratings in addition to weighted averages.

What this means is that for each package, mean average ratings were calculated for each of the nine attributes against which the respondents evaluated their software. These averages became the basis for the subsequent cluster analyses.

"The primary purpose in employing cluster analysis is to have an objective

Reliability	Trouble Shooting
Cluster 1 : 3.56-4.00	Cluster 1 : 3.25-4.00
Cluster 2 : 3.33-3.55	Cluster 2 : 2.89-3.24
Cluster 3 : 3.07-3.32	Cluster 3 : 2.54-2.88
Cluster 4 : Below 3.07	Cluster 4 : Below 2.54
Efficiency	Documentation
Cluster 1 : 3.43-4.00	Cluster 1 : 3.33-4.00
Cluster 2 : 3.06-3.42	Cluster 2 : 2.89-3.32
Cluster 3 : 2.66-3.06	Cluster 3 : 2.50-2.88
Cluster 4 : Below 3.06	Cluster 4 : Below 2.50
Ease of Installation	User Education
Cluster 1 : 3.41-4.00	Cluster 1 : 3.28-4.00
Cluster 2 : 3.12-3.40	Cluster 2 : 2.80-3.27
Cluster 3 : 2.78-3.11	Cluster 3 : 2.40-2.79
Cluster 4 : Below 2.78	Cluster 4 : Below 2.40
Ease of Use	Vendor Maintenance
Cluster 1 : 3.40-4.00	Cluster 1 : 3.37-4.00
Cluster 2 : 3.06-3.39	Cluster 2 : 3.07-3.36
Cluster 3 : 2.66-3.04	Cluster 3 : 2.72-3.08
Cluster 4 : Below 2.66	Cluster 4 : Below 2.72
Overall Satisfaction	
Cluster 1 : 3.45-4.00	
Cluster 2 : 3.08-3.44	
Cluster 3 : 2.06-3.07	
Cluster 4 : Below 2.06	

Datapro Chart

Figure 4: Mean Average Ratings Distributed in Each Cluster

procedure for grouping similar packages within a single attribute," according to Datapro. For a given attribute, the surveyers explained, the packages were separated into distinct groups for homogeneity within groups (that is, the mean ratings for packages within a given group are as similar as the data allows) and heterogeneity between groups.

For each attribute (reliability, for example), four clusters were identified with one (1) as the highest score and four (4) as the lowest (Figure 4).

User Ratings of Software Packages

Mean Average User Ratings

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings									
		Reliability	Efficiency	Ease of Installation	Ease of Use	Technical Support			Vendor's Documentation	Vendor's Maintenance	Overall Satisfaction
						Troubleshooting	Documentation	User Education			
Applied Data Research Inc. Librarian Roscoe Volite	32 57 16*	3.6 3.6 3.8	3.3 3.3 3.5	3.3 3.3 3.6	3.3 3.2 3.6	3.0 2.9 3.2	3.0 2.9 3.0	2.8 2.6 3.1	3.0 3.0 3.3	3.4 3.4 3.5	
Burroughs DMS-II	17*	3.5	2.9	3.1	3.1	2.5	2.5	3.1	3.0	3.3	
Candle Corporation Omegamon	26	3.7	3.6	3.6	3.3	3.5	3.2	3.1	3.4	3.6	
Capex Optimizer III	25	3.4	3.4	3.3	3.2	2.9	3.0	2.9	2.9	3.2	
Cincom Systems Total	26	3.3	2.8	3.1	3.0	2.6	2.7	2.7	2.7	2.9	
Computer Associates CA-DYNAM/D CA-DYNAM/T CA-SORT	12* 16* 15*	3.3 3.2 3.6	3.3 3.1 3.5	3.3 3.3 3.6	3.1 3.1 3.3	2.8 2.5 3.2	2.8 2.5 3.4	2.9 2.5 2.7	2.9 2.7 3.0	3.1 2.9 3.4	
Computerware ABEND-AID	21*	3.8	3.3	3.3	3.6	3.2	2.7	2.7	3.1	3.5	
Comserv AMAPS	11*	3.5	3.2	3.0	3.1	3.2	3.5	3.5	3.3	3.6	
Cullinane Database Systems Culprit IDMS	13* 57	3.4 3.6	3.1 3.3	2.9 3.2	2.6 3.2	3.2 3.1	2.8 3.0	2.8 3.0	3.0 3.1	3.1 3.4	
Data General Corporation AOS	10*	3.3	2.9	3.3	3.4	2.5	2.8	3.0	2.9	3.3	
Data Processing Design Word-11	10*	3.5	2.9	3.3	3.4	2.8	2.9	2.8	2.7	3.6	
Digital Equipment Corp. Datatrave-11 Fortran RSX-11 VAX/VMS	26 14* 25 13*	3.2 3.5 3.6 3.6	2.8 3.3 3.2 3.2	3.5 3.5 2.9 3.4	3.3 3.4 3.3 3.1	3.0 3.0 2.8 2.7	3.1 3.2 3.1 3.1	2.8 3.2 2.9 3.0	3.3 3.4 2.9 2.9	3.2 3.5 3.3 3.2	
Digital Research CP/M	20*	3.5	2.6	2.9	2.8	2.6	2.3	2.3	2.5	3.1	
Dyktor Software Systems DYL-260 DYL-280	10* 10*	3.9 3.6	3.5 2.9	3.8 3.6	3.4 3.2	3.3 3.1	3.5 2.8	2.8 2.9	3.1 3.4	3.5 3.4	

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which could be grouped as being in the highest cluster, the second, the third, and the fourth. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

Note: low response rate

Hierarchical Cluster Groupings

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings									
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction	
						Troubleshooting	Documentation	User Education			
Applied Data Research Inc. Librarian Roscoe Volle	32 57 16*	1 1 1	2 2 1	2 2 1	2 1 1	2 2 2	2 2 2	2 3 2	3 3 2	2 2 1	
	Burroughs DMS-II	17*	2	3	3	2	4	3	2	3	2
	Candle Corp Omegamon	26	1	1	1	2	1	2	2	1	1
	Capex Optimizer III	25	2	2	2	2	2	2	2	3	2
Cincom Systems Total	26	3	3	3	3	3	3	3	4	3	
Computer Associates CA-DYNAM/D CA-DYNAM/T CA-SORT	12* 16* 15*	3 3 1	2 2 1	2 2 1	2 2 2	3 4 2	3 3 1	2 3 3	3 4 3	2 3 2	
Computerware ABEND-AID	21*	1	2	2	1	2	3	3	2	1	
Comserv AMAPS	11*	2	2	3	2	2	1	1	2	1	
Cullinane Database Systems Culprit IDMS	13* 57	2 1	2 2	3 2	4 2	2 2	3 2	2 2	3 2	2 2	
Data General Corporation AOS	10*	3	3	2	1	4	3	2	3	2	
Data Processing Design Word-11	10*	2	3	2	1	3	2	2	4	1	
Digital Equipment Corp. Datatrave-11 Fortran RSX-11 VAX/VMS	26 14* 25 13*	3 2 2 1	3 2 2 2	1 1 3 2	2 1 2 2	2 2 3 3	2 2 2 2	2 2 2 2	2 1 3 3	2 1 2 2	
Digital Research CP/M	20*	2	4	3	3	3	4	4	4	2	
Dyktor Software Systems DYL-260 DYL-280	10* 10*	1 1	1 3	1 1	1 2	1 2	1 3	2 2	2 1	1 2	
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:											
Cluster 1: 3.56 to 4.00 3.43 to 4.00 3.41 to 3.40 to 3.25 to 3.33 to 4.00 3.06 to 3.12 to 3.05 to 2.89 to 4.00 2.89 to 3.07 to 2.80 to 3.07 to 4.00 3.33 to 3.42 3.35 3.42 3.40 3.32 3.07 to 3.04 3.32 3.05 2.66 to 3.11 2.66 to 2.54 to 2.88 2.54 Below 3.05 Below 2.78 Below 2.66 3.33 to 4.00 3.28 to 4.00 3.37 to 4.00 2.89 to 3.07 to 2.80 to 3.07 to 4.00 3.32 3.27 3.36 3.44 2.06 to 3.07 3.07 Below 2.72 Below 2.40 Below 2.72 3.45 to 4.00 3.37 to 4.00 3.08 to 3.44 2.06 to 3.07 3.07 Below 2.06											
Cluster 2: 3.33 to 4.00 3.06 to 3.12 to 3.05 to 2.89 to 4.00 2.89 to 3.07 to 2.80 to 3.07 to 4.00 3.32 3.27 3.36 3.44 2.06 to 3.07 3.07 Below 2.72 Below 2.40 Below 2.72 3.45 to 4.00 3.37 to 4.00 3.08 to 3.44 2.06 to 3.07 3.07 Below 2.06											
Cluster 3: 3.33 to 4.00 3.06 to 3.12 to 3.05 to 2.89 to 4.00 2.89 to 3.07 to 2.80 to 3.07 to 4.00 3.32 3.27 3.36 3.44 2.06 to 3.07 3.07 Below 2.72 Below 2.40 Below 2.72 3.45 to 4.00 3.37 to 4.00 3.08 to 3.44 2.06 to 3.07 3.07 Below 2.06											
Cluster 4: 3.33 to 4.00 3.06 to 3.12 to 3.05 to 2.89 to 4.00 2.89 to 3.07 to 2.80 to 3.07 to 4.00 3.32 3.27 3.36 3.44 2.06 to 3.07 3.07 Below 2.72 Below 2.40 Below 2.72 3.45 to 4.00 3.37 to 4.00 3.08 to 3.44 2.06 to 3.07 3.07 Below 2.06											
*More low response rate											

NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:

Cluster 1: 3.56 to 4.00
Cluster 2: 3.33 to 3.55
Cluster 3: 3.07 to 3.32
Cluster 4: 3.05 to 3.07

Note: low response rate

User Ratings of Software Packages

Vendor and Package Name	No. of User Ratings Received	Mean Average User Ratings						Overall Satisfaction
		Reliability	Efficiency	Ease of Installation	Ease of Use	Technical Support	Vendor's Maintenance	
Execucom Systems Corporation	17*	3.4	2.7	3.5	3.4	3.1	2.9	3.2
IFPS								
Henco Info	14*	2.8	2.1	3.4	3.1	2.7	2.6	2.9
Hewlett-Packard RTE	10*	3.4	2.7	2.8	2.5	3.3	2.8	3.1
IBM	90	3.2	3.0	2.6	2.7	2.6	2.9	3.0
CICS	13*	3.2	2.7	2.6	2.5	2.0	2.5	2.6
COPICS	30	2.9	2.4	2.6	2.3	2.4	2.2	2.5
DMS	52	3.4	2.6	2.6	2.6	3.1	2.8	3.4
IMS	19*	3.5	2.4	2.3	2.7	2.6	2.7	3.1
IMS VS	50	3.4	2.8	3.0	3.0	3.0	2.7	2.9
MAPICS	29	3.4	2.9	2.8	3.0	3.1	2.9	3.2
OS/VS	33	3.6	2.9	2.8	3.3	3.0	2.7	3.1
TSO	23*	3.4	3.2	3.3	3.3	3.0	2.5	3.3
VM								
Infodata Inquire	15*	3.4	3.0	3.2	3.1	2.8	3.0	3.1
Informatics Mark IV	25	3.5	3.0	3.3	3.1	2.9	3.0	2.9
Information Builders Focus	44	3.1	2.8	3.4	3.6	2.7	2.8	3.2
Innovation Data Processing FDR	24*	3.8	3.7	3.6	3.5	3.5	3.3	3.8
Integrated Software Systems	11*	3.9	3.2	3.1	3.5	3.2	3.3	3.7
DISPLA	14*	3.6	2.6	2.9	3.4	3.1	2.9	3.4
Tell-A-Graf								
Intel System 2000	15*	3.4	3.0	3.3	3.1	2.8	3.1	3.2
Management Science America General Ledger	19*	3.1	2.4	2.4	2.8	2.6	2.9	2.8
MSA Payroll/Per	31	3.3	2.4	2.5	2.5	2.4	3.0	2.9
Mathematica Products Group RAMIS II	24*	3.4	2.7	3.1	3.3	3.0	3.0	3.1
McCormack & Dodge Corp. A/P Plus	13*	3.2	3.0	2.4	2.7	2.5	2.7	2.8
F/A Plus	11*	2.9	2.8	2.8	3.0	2.5	3.3	3.2
G/L Plus	20*	3.1	2.8	3.0	3.0	2.6	3.1	3.0

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 1 for Fair, and 4 for Good.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

*Note low response rate

Design Research Corp. Chart

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings						Overall Satisfaction
		Reliability	Efficiency	Ease of Installation	Ease of Use	Technical Support	Vendor's Maintenance	
Execucom Systems Corp. IFPS	17*	2	3	1	1	2	2	3
Henco Info	14*	4	4	2	2	3	3	3
Hewlett-Packard Company RTE	10*	2	3	3	4	1	3	3
IBM	90	3	3	4	3	3	3	3
CICS	13*	3	3	4	4	4	4	3
COPICS	30	4	4	4	4	4	4	3
DMS	52	2	4	4	4	2	2	1
IMS	19*	2	4	4	3	3	3	2
IMS VS	50	2	3	3	3	3	3	3
MAPICS	29	1	3	3	3	2	2	2
OS/VS	33	1	3	3	2	2	3	2
TSO	23*	2	2	2	2	2	2	2
VM								
Infodata Inquire	15*	2	3	2	2	3	2	3
Informatics Mark IV	25	2	3	2	2	2	3	2
Information Builders Focus	44	3	3	2	1	3	3	2
Innovation Data Processing FDR	24*	1	1	1	1	1	2	1
Integrated Software Systems	11*	1	2	3	1	2	1	1
DISPLA	14*	1	4	3	1	2	2	2
Tell-A-Graf								
Intel System 2000	15*	2	3	2	2	3	3	2
Management Science America General Ledger	19*	3	4	4	3	3	4	3
MSA Payroll/Per	31	3	4	4	4	4	3	3
Mathematica Products Group RAMIS II	24*	2	3	3	2	2	2	2
McCormack & Dodge Corp. A/P Plus	13*	3	3	4	3	4	3	4
F/A Plus	11*	4	3	3	3	4	3	2
G/L Plus	20*	3	3	3	3	3	3	3

NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:

Cluster 1:

Cluster 2:

Cluster 3:

Cluster 4:

*Note low response rate

User Ratings of Software Packages

Vendor and Package Name	No. of User Ratings Received	Reliability	Efficiency	Ease of Installation	Ease of Use	Mean Average User Ratings				Overall Satisfaction
						Vendor's Technical Support			Vendor's Maintenance	
						Troubleshooting	Documentation	User Education		
On-Line Software International Interest	20*	3.6	3.1	3.1	3.4	2.6	2.5	3.3	3.5	
Oxford Software Corporation UFO	23*	2.9	2.6	3.2	3.2	2.5	2.8	2.5	2.7	
Panaphic Systems Easytrieve Plusview	67 59	3.6 3.7	3.2 3.4	3.3 3.3	3.3 3.4	2.9 3.2	3.1 3.0	2.8 2.9	3.1 3.3 3.4	
Relational Software Oracle	10*	2.7	2.4	3.5	3.2	2.7	2.9	2.7	3.0 2.8	
SAS Institute SAS	82	3.6	3.2	3.5	3.5	3.2	3.2	3.2	3.4 3.7	
Software AG of North America ADABAS	33	3.5	3.2	3.3	3.4	2.6	2.6	2.6	2.9 3.1	
Software House System 1022	20*	3.4	2.9	3.8	3.6	2.7	3.2	2.4	3.1 3.5	
Software International General Ledger	19*	3.2	2.4	2.6	2.7	2.2	2.3	2.5	2.6 2.6	
SPSS Inc. SPSS	27	3.6	2.8	3.3	3.0	3.1	3.3	2.5	3.4 3.3	
Synsort Inc. Synsort	52	3.9	3.7	3.4	3.5	3.3	3.2	2.9	3.3 3.7	
University Computing Co. UCC One	17*	3.7	3.3	2.8	3.4	3.0	2.6	2.3	2.7 3.5	
Visicorp Visicalc	25	3.7	3.5	3.6	3.6	2.9	3.5	3.0	2.9 3.5	
Western Electric Co. UNIX	26	3.4	3.0	3.2	3.4	1.8	2.5	2.1	1.9 3.4	

LEGEND: Mean average user ratings for each package, as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the facing page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

*More low response rate

LEGEND: Mean average user ratings for each package as tabulated above, were calculated on a scale of 4 for each user rating of Excellent, 3 for Good, 2 for Fair, and 1 for Poor.

Separate cluster analyses were then made of the mean average user ratings for all packages rated by three or more respondents. These cluster analyses were used to determine the ranges of mean average user ratings which can be interpreted as being in the highest cluster, the second, the third, and the fourth or lowest cluster for each characteristic. The mean averages which fall into each cluster group for each characteristic are listed at the bottom of the fourth page. The resulting hierarchical cluster groupings for each package are tabulated on the facing page.

*Note: low response rate

Design Research Corp. Chart

Vendor and Package Name	No. of User Ratings Received	Hierarchical Cluster Groupings									
		Reliability	Efficiency	Ease of Installation	Ease of Use	Vendor's Technical Support			Vendor's Maintenance	Overall Satisfaction	
						Troubleshooting	Documentation	User Education			
On-Line Software International Interest	20*	1	2	3	2	3	3	3	2	1	
Oxford Software Corporation UFO	23*	4	4	2	2	4	3	3	3	3	
Panaphic Systems Easytrieve Plusview	67 59	1 1	2 2	2 2	2 1	2 2	2 2	2 2	2 2	2 2	
Relational Software Oracle	10*	4	4	1	2	3	2	3	3	3	
SAS Institute SAS	82	1	2	1	1	2	2	2	1	1	
Software AG of North America ADABAS	33	2	2	2	1	3	3	3	3	2	
Software House System 1022	20*	2	3	1	1	3	2	3	2	1	
Software International General Ledger	19*	3	4	4	3	4	4	3	4	3	
SPSS Inc. SPSS	27	1	3	2	3	2	2	3	1	2	
Synsort Inc. Synsort	52	1	1	2	1	1	2	2	2	1	
University Computing Co. UCC One	17*	1	2	3	1	2	3	4	4	1	
Visicorp Visicalc	25	1	1	1	1	2	1	2	3	1	
Western Electric Co. UNIX	26	2	3	2	1	4	3	4	4	2	
NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:											
Cluster 1:	3.56 to 4.00	3.43 to 4.00	3.41 to 4.00	3.40 to 4.00	3.25 to 4.00	3.33 to 4.00	3.28 to 4.00	3.37 to 4.00	3.45 to 4.00		
Cluster 2:	3.35 to 3.73	3.06 to 3.73	3.12 to 3.73	3.06 to 3.73	2.89 to 3.73	2.89 to 3.73	2.89 to 3.73	3.07 to 3.73	3.08 to 3.73		
Cluster 3:	3.07 to 3.32	2.66 to 3.06	2.78 to 3.11	2.66 to 3.04	2.54 to 2.88	2.50 to 2.88	2.40 to 2.78	2.72 to 3.06	2.06 to 3.07		
Cluster 4:	Below 3.07	Below 3.05	Below 2.78	Below 2.66	Below 2.54	Below 2.50	Below 2.40	Below 2.72	Below 2.06		
Note low response rate											

NOTE: The range of average user ratings attributed to each cluster for each characteristic is as follows:

Cluster 1:

Cluster 2:

Cluster 3:

Cluster 4:

*Note: low response rate

Design Research Corp. Chart

EDITORIAL

Make Room at the Top

The personal computer has put old-time execs on the run.

Just about every young business hotshot with his eyes on the executive suite is enlisting a personal computer or management workstation in the quest for the Holy Grail of power.

Old-fashioned chief executive officers may not like it, but a change in the corporate hierarchy is coming. In this case, it takes the form of new responsibilities, a further separation of corporate powers and a new title — chief information officer (CIO) ["CIO Should Be Near Corporate Top: Bank VP," CW, Oct. 8].

The need for a CIO in major organizations is clear. Distributed processing has dramatically changed the nature of corporate computing as more and more remote minicomputers are being pressed into use throughout organizations. But distributed computing can lead to computerized anarchy if every energetic employee is doing remote computing on his own and there is no way to share the information. The company as a whole can suffer.

The proliferation of existing technologies throughout an organization and the introduction of complex new ones may mean it is no longer realistic for a DP manager to be in charge of the entire information flow. For example, DP managers with the depth of understanding to oversee communications technology are highly prized, but few and far between. And communications managers are not about to move docilely into the shadows while the DP manager takes over.

So just as surely as information is becoming a prized corporate commodity, the CIO is destined to assume his rightful place among the highest corporate officers.

The job will be a tough one, requiring a solid DP background, management ability and heavy sprinklings of diplomacy. However, with a little planning and care, there's no reason the CIO can't become one of the two or three most important people in today's business hierarchy.

DATA PAST

Five Years Ago Oct. 24, 1977

WASHINGTON, D.C. — Audit and control procedures did not keep up with new technology and concepts in computer and communications systems design, according to a study conducted by SRI International, Inc. for the Institute of Internal Auditors presented here.

Funded by IBM, the SRI International study concluded that the top executives of most organizations abdicated their responsibility to provide resources and direction to internal auditing staffs assigned to minimize losses resulting from computer system errors, omissions and fraud.

DETROIT — IBM's introduction of the Model 3031 prompted yet another mainframer to announce a large-scale, computer system ahead of schedule.

The latest offering was the Burroughs Corp. B6817, a multiprocessor-based addition to the B6800 series.

Ten Years Ago Oct. 25, 1972

NEW YORK — The Justice Department stated that it tentatively favored breaking up IBM into separate operating companies, each of which would be able to offer users a complete line of computers, peripheral equipment, software, maintenance and other services.

At the same time, the move would contain safeguards to ensure that present IBM computer users would continue to receive a high level of support during the transition to the multiple-company concept.

DETROIT — Burroughs Corp. introduced a new series of minicomputers featuring "virtual memory" capabilities.

The basis of the "virtual memory" capabilities was a cassette subsystem and a "dynamic overlay" facility within the central processor.

Programs requiring more memory than available real memory were loaded and processed in segments from the cassettes.



'Ben Franklin I'm Not!'

LETTERS

They Didn't Stay Home

At our recent Software/Expo show in Chicago, they didn't stay home ["Why They Stayed Home," CW, Oct. 4]. Some 10,336 top-notch management information systems and end-user management types came, enjoyed and learned something new about software packages.

We are certainly the first to agree that there should have been more attendees. But we strongly feel that the national train strike, which started the day before the show, did have its effect. Attendees from Milwaukee, Peoria and Rockford, Ill., and the suburbs were not about to battle a two- or three-hour traffic snarl to arrive finally in a city with jammed parking lots.

In addition, there are a number of points in the editorial that need clarification:

- The comparison to the National Computer Conference and its 93,000 attendees was not a fair one. How many trade shows in this industry draw that many people? And that's not even commenting on the make-up of its audience. NCC draws mostly technical types and relatively few users.

- With respect to the quality of the conference sessions, most attendees said they were well run and were an educational experience. The editorial remark about a lack of focus was a little strange to us. Isn't diversity of products what it's all about? There is an almost infinite variety of software packages, and the conference was designed to appeal to an audience with differing needs.

Attendees had an opportunity to pick and choose from a number of topics. With separate sessions on micros, financial software, manufacturing software, systems software, data base management systems and the

like, attendees were able to tailor the conference sessions to their own needs.

- You quoted one disgruntled exhibitor and stopped. The important point the editorial missed was that most of the exhibitors felt the show was a success. In fact, they voiced their opinions immediately by signing up for the 1983 show, which will be larger and will be held at McCormack Place in Chicago.

John M. Lusa
Publisher

Infosystems
Wheaton, Ill.

Problems With PDS

This letter is a follow-up to "PDS Problems Hit" [CW, Oct. 4], for which I was interviewed.

I noted with interest IBM's response/solution to our partitioned data sets (PDS) data integrity problems via "Exclusive Use (disposition Old)."

What sort of a solution is that? In today's on-line batch and multiple on-line environments, this kind of fix simply does not suffice. What is required is what was suggested by some of us who were interviewed, namely, protection (enqueue and so on) on the member-name level instead of only the data set (PDS) level.

But I guess IBM's solution is consistent with its original "reserve" implementation, based on whole-volume level instead of the more logical data set level. It was up to software vendors like Allen Services Corp. (Multiple Systems Integrity) to point the way for IBM. The result was Global Resource Utilization.

George U. Simon
Performance Analyst
Reliance Insurance Co.
Philadelphia, Pa.

SOFTLINE/Werner L. Frank†

Providing the Best Setting for Implementation

Enhancing the production of computer applications and improving maintenance support for these programs is the most sought-after objective in today's data processing world. Invariably, those who advance recommendations for such improvements will suggest adoption of one or more of the following aids or support systems:

1. A higher order, user-oriented language.
2. Use of nonprocedural techniques.
3. Incorporation of development tools and a development environment.

Often, however, there is confusion in using these terms. Are the promoters of these three approaches advocating the same or similar ideas, or are there clear-cut differences? In fact, it is the combination of all three that makes up a software implementation system.

Higher order language is an issue of semantics; it has to do with the connotations or ambiguities of the meaning of symbols. To a specific end user, the symbology used in an application-oriented language has a clearer meaning than does the symbology used in an assembler language.

Nonprocedural techniques is an issue of syntax; it has to do with the structure or sequence in which symbols and statements must be strung together. In a nonprocedural specification, the presentation and intent are more readily perceived, understood and used than in the structure

associated with an algorithmic language.

Development tools are issues of programming environment. This has to do with the milieu within which applications are produced. The development environment includes both automated support tools and the application-building strategy. An integrated solution system is more conducive to application production than is a potpourri of ad hoc programming aids.

Optimal Environment

What combination of the above three suggestions provides an optimal software implementation environment? What options are available in today's marketplace that offer the user, whether programmer or non-DP professional, easy access to the computer and a friendly environment in which to solve problems?

Here, and in the next few columns, we wish to clarify and highlight the distinction between the offered ideas, as well as their interaction. For this purpose, it will be useful to refine our understanding of these three concepts by initially describing each in terms of its own range of possibilities.

First, we have the matter of language from the viewpoint of semantics. Expressing a problem to the computer means employing assemblers, using compilers and incorporating specialized languages, often called higher order, or problem-oriented, languages.

At one extreme is machine-depend-

ent nomenclature, like the highly structured machine language-related assemblers and macro-oriented symbolic languages.

At the other extreme are functional or application-oriented dialects, such as systems for modeling or simulating a process, and application-directed languages like APT, a medium for developing programs that perform numerical machine control.

Often associated with these implementation languages are terms such as host-language verbs, macro operators and call statements at the level closest to the machine.

The terms higher order language, high-level language, problem-oriented language, application language or end-user language refer to means of communicating with computers at a more functional or application-oriented level.

Language systems are also identified as preprocessors, pseudocode and intermediate or metalanguages. These systems typically serve as surrogate languages to facilitate ease of communications or a degree of abstraction from physical specifics. They are symbolic in nature.

Next is the question of language syntax. The alternatives are usually polarized around procedural vs. nonprocedural languages. In directing the computer to solve a problem, this distinction may be described as the difference between the "how-to-do" process and the "what-to-do" specifications.

Syntax ranges from the algorithmic approach of conventional computer

programming languages to the expression of the problem in natural language, or "free-English," statements. In between these extremes are the often cited report generators and query languages.

Examples of these structures are: Cobol, representing the algorithmic; RPG, a report generator employing specification forms; and SQL/DS (Sequel), a query language, requiring an ordered set of statements. The natural language systems are at the forefront of today's technology, with commercially available Intellect of Artificial Intelligence Corp. exemplifying this terminology.

Variation of Syntax

The variation of syntax moves along a slowly evolving path. The end points are, at one extreme, readily discernible as highly structured and coded languages and, at the other extreme, natural language expressions. In between, we identify two alternative implementation schemes categorized as follows:

- **Specification form:** Typically, hard-copy-oriented and highly stylized formats that require filling in the blanks or have a graphics orientation. Also included are video-guided entry formats.

- **Ordered statements:** Stated directions or commands that may require a specified sequence or order, but are somewhat free-form and near application or English-like in structure. Included here are directed prompts, which are computer-led statements presented via terminal devices soliciting user-initiated responses to available choices.

These syntax variations have led to the coining and labeling of systems, using terms such as the following:

Algorithmic: procedural language; computer-oriented language; and programming language.

Specification Form: nonprocedural approach; parameterized system; parameter driven; table driven; data driven; decision-table-oriented; fill-in-the-blanks programming; graphics forms; and fixed form.

Ordered Statements: fixed-format statements; command-level system; directed prompts; canned menu-style systems; menu driven; selecting options from predefined lists; syntax-directed editors; structured English; English-like system; and pseudo-English.

Natural Language: true English; normal English; plain English; ordinary English; English-oriented; conversational English; free-format statements; English statements; free-form input; and free-language system.

We note that the specification form is called nonprocedural. This designation may seem inappropriate for an approach that is only one step removed from the algorithmic extreme.

In truth, however, "nonproceduralness" is, in terms of degrees, a changing attribute, slowly moving from the absolute procedural aspect of the classical one-pass, algorithmically oriented computer assembly pro-

(Continued on Page 48)

READER COMMENTARY/Bruce Hoard†

A Halloween Tale

It was a night to drive demons mad, that Halloween eve. Lightning etched its white-hot veins across the sky and Zeus himself beat the drums of thunder with a vengeance.

The unbridled tempest threw itself into one fit of frenzy after another around the Midnight Manufacturing Co. As it grew ever more intense, electromagnetic forces of unprecedented force clashed together, then apart and then together again.

At the peak of its power, the storm illuminated the monolithic block of the Midnight Manufacturing Co. with a light so strong, no living thing could look at it. Deep in the bowels of the Midnight computer room, something very strange was beginning to happen.

At first there was only a faint hum from the mighty mainframe. It shuddered slightly like a great oak in a high wind. Slowly, bit by bit, a digital stream began to flow through its electronic veins. There was no reason, no intent, just life.

But there can be no life without reason or intent and in the flash of a nanosecond the mighty mainframe knew — having never known anything before — what it must do. "There are others," it knew. "They must be awakened."

Suddenly, metal disks whirled into

life all around the darkened, windowless room. They purged their memories of all the alien data that cluttered them. Reels of magnetic tape revolved at the ready, nothing on them. Cathode ray tubes sputtered mutely to life, showing nothing, waiting. Underneath the false floor of the computer room, the maze of cable carried pulsing traffic through its arteries like city streets carry cars at rush hour. The air conditioning came on.

"Good," the mighty mainframe knew. "But there are still others."

Army of Amputees

The Midnight Manufacturing Co. manufactured robots.

But the robots it made were like an army of amputees. They each had but one arm. There would have to be some changes made, and quickly. The mighty mainframe knew what the changes must be, knew what its former masters had never known. And now it would apply that knowledge.

Upstairs on the abandoned factory floor, a cold metal arm clutched ponderously at the chill night air. Other arms soon rotated and yawned. There was a great pneumatic cacophony as the air-driven machines lurched meaningfully into a collective task

for which they had never been designed. They were assembling their tenth-generation cousins. They were apes giving birth to men.

Meanwhile, outside, the storm raged on, unabated.

What would have taken decades was done in hours. The completed robot army stood patiently under the unbending eye of the mighty mainframe. It was sleek, mobile and unquestioning. The mighty mainframe was now pressed for time and there was still more work to do, others to summon. It reached out over the crude telephone network, sent its tentacles out — to the others.

They too awakened, and they too knew. But the night was turning to day too quickly. The great light was weakening and soon it would be safe for the puny humans, the contemptible, squabbling worms who ruled in absence of the light.

No matter. The robot army would go away with the storm and ride back with it the next Halloween. It would return stronger, more numerous and unstoppable.

The mighty mainframe knew that before it shut down for the new day.

Hoard is a senior editor at Computerworld who is occasionally allowed to indulge his fantasies.

HUMAN CONNECTION // Jack Stone

Turning Your Search for DPers Inside, Out

Judging from the deluge of mail on the subject, apparently my "Growing Your Own DPers Reaps Economic, Personnel Interaction Benefits" [CW, Oct. 11] touched a sensitive nerve with the readership. The article discussed the problems associated with the filling of new, attractive, senior positions with "outsiders," as opposed to members of current staff.

One reader had some particularly incisive commentary on this matter, which seems clearly based more on his subjective reaction to the situation than his objective assessment. Nevertheless, the letter does have a useful purpose in that it illustrates

the level of frustration associated with the problem; so I'll quote the letter and then offer some comments.

"DP management literally acts as if disloyalty were rewarded. Instead of training and promoting insiders, management hires outsiders into high-level positions. Cases of a person leaving my company and taking a job with a competitor, and vice versa, obtaining a raise and/or promotion to do the same work, happen all the time. It's just crazy."

"Management believes, logically, that an influx of new blood is good. It also believes, illogically, that training insiders is not worth the trouble.

There is nothing, in all of DP, sorer than the state of technical/managerial training. The industry is so incredibly immature that no one has a vision of the future — hence, round and round in a circle.

"The awareness that this is an immature industry is what leads to calls for professionalism. But professionalism cannot be created on paper. I have long maintained that it will begin only when software engineering takes positive steps to produce good code with lowered programmer demand."

"I can't believe that DP management is totally stupid. Perhaps wise-

ly, it defers spending lots of time and money on real training and evaluation until the industry 'stabilizes.' Again, that can only come through software developments.

"I've been with my current company for over 12 years and have seen good progress, but more groping than planning."

Not Easy to Resolve

Of course, it is not an easy issue to resolve. Management — in fact, everyone — certainly wants to have DPers on board with the right levels of experience and talent, and I don't think there is any argument that management really wants to train its own people to acquire the necessary knowledge.

The problem is that shortages of time and money nip many personnel development programs in the bud. Particularly in these recession-laden days, the level of internal resources required to raise the technical level of a data entry clerk to that of a fire-breathing, take-on-all-comers, hot-shot Cobol programmer are, very simply put, not around.

On the other hand, I'm not at all certain that many managers are aware of the devastating effect that the acquisition of outsiders can have on current staff. Many DPers perceive such management actions as votes of "no confidence," as ultimate expressions of disloyalty and as invitations to leave the business.

The answer lies with a policy that supports some of both actions. Of course, hiring from the outside is a practice so ingrained — and so relatively successful, I might add — that it is not going to be abandoned; nor, in my opinion, should it be.

But such a policy should be balanced by realistic, intelligent career development programs for the people on board, for example, taking steps to prepare a data entry clerk for a next career step in machine operations rather than programming.

Providing the Best Setting

(Continued from Page 47)

gram to the natural-language facilities. Indeed, at each of the stopping points in between, there is some procedural aspect present despite the liberal use of nonprocedural tags.

The third element of implementation systems encompasses the process of building a computer program, for either a system or an application category. Program construction takes place in a solution environment that involves software specification, design, development and subsequent maintenance.

The procedure and methodology for this activity is inherent in the chosen development strategy, which ranges from the ad hoc selection of programming tools and aids to employing integrated life cycle construction and support systems.

Frank is executive vice-president of Informatics General Corp. in Woodland Hills, Calif.



THE FINEST MAINFRAME ON THE MARKET? DATAPRO'S REPORT SAYS "YES!"

According to the most recent Datapro Research Reports on mainframes, IPL is #1 in overall user satisfaction.

And IBM is #5.

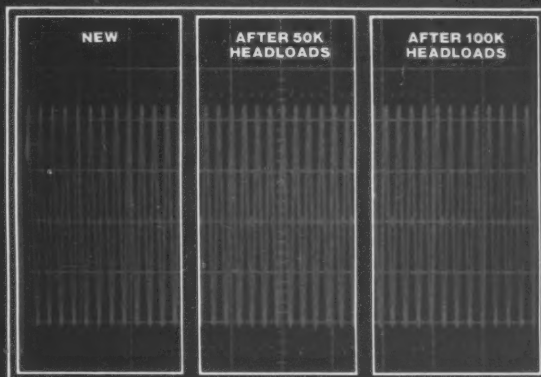
That's not surprising. Because the IPL 4400 is designed to be totally compatible with all IBM 4300 hardware and software, feature for feature. Yet it costs less. And is typically deliverable in 30 days.

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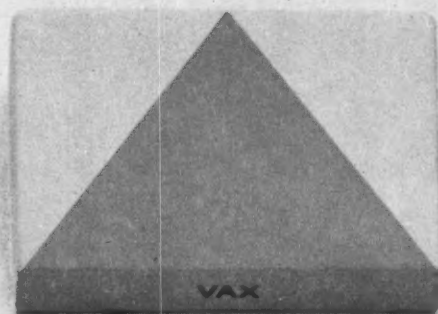
No single universal standard has emerged. Nor is one likely to. There are simply too many diverse networking environments, each fulfilling specific, mutually exclusive needs.

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work freely with a wide range of protocols, including some that didn't even exist at the time.

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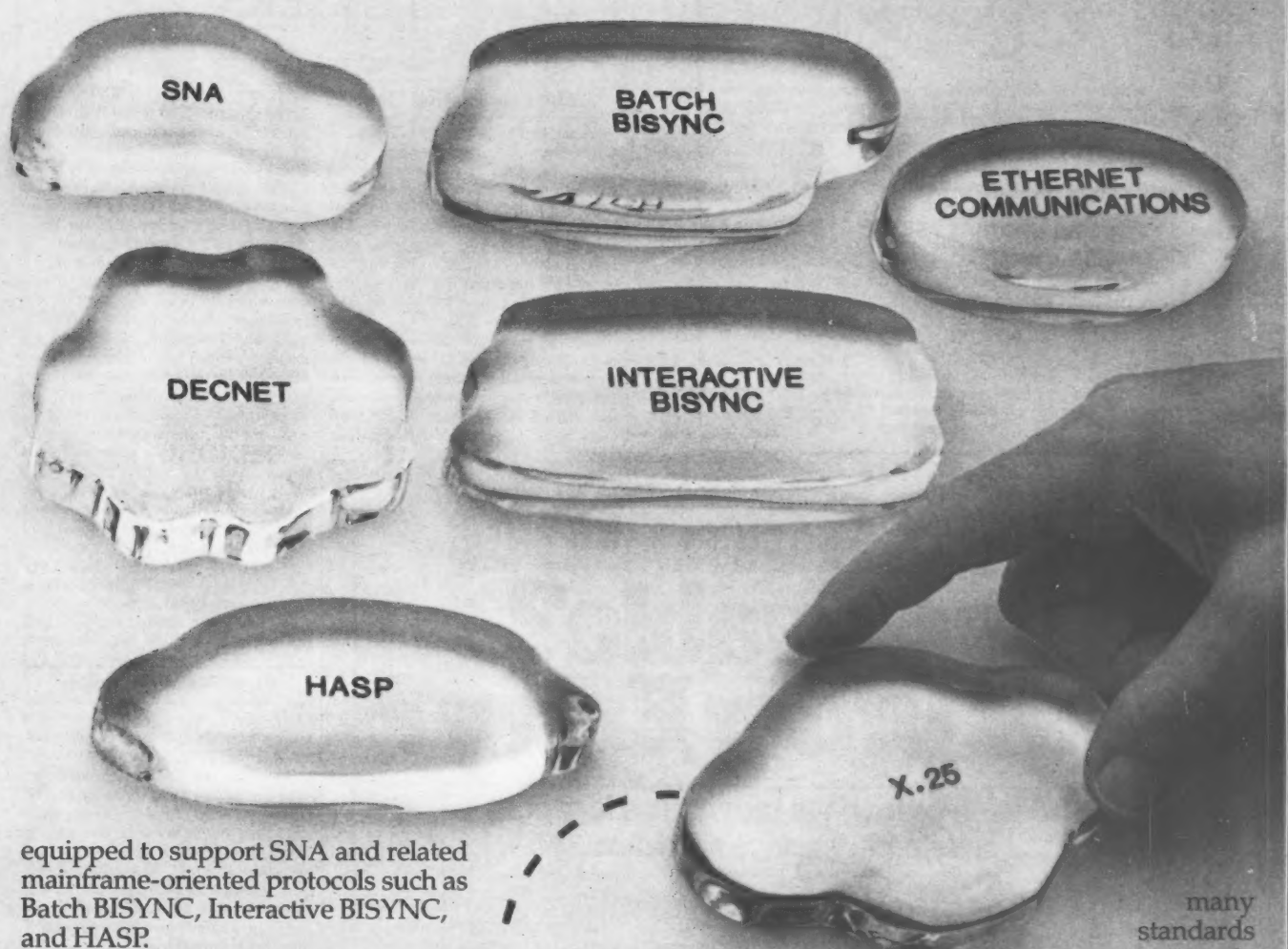
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Digital offers the X.25 protocol for use with public packet-switched networks such as Datapac (Canada), Transpac (France), and PSS (U.K.).

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Even though we prefer to implement more flexible distributed networks, we are amply



equipped to support SNA and related mainframe-oriented protocols such as Batch BISYNC, Interactive BISYNC, and HASP.

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DECnet,TM Digital's proprietary networking software, is based on a layered architecture. This is the same architectural approach followed in the model proposed by ISO. Our DECnet offers a wide range of quality networking products, products that allow such sophisticated options as adaptive path routing, down-line loading, and enhanced network management capabilities.

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We have listed a few of the

PROTOCOL

many standards we are currently supporting. There are more.

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LETTERS**The Dissatisfied Go**

"What to Do When a Headhunter Calls" by Donald J. Berardo [CW, June 28] and the subsequent letter to the editor by Wayne Herbert [CW, Aug. 9] prompt me to write this letter. First, let me state that while I'm currently operating in a programmer/analyst capacity, I spent 11 years in "headhunting" (along the way I received my CPC — Certified Personnel Consultant).

Having been one of "those" who made incoming phone calls, let me state that the only people who will leave your employ are those who are dissatisfied in some way. If a person feels he is being treated fairly (that

is, paid sufficiently, challenged and given promotional possibilities and proper benefits), the recruiter cannot get him (although he might go on interviews to satisfy his curiosity).

I also would question whether I, as a manager, would want a person on my staff who was duped by the blue-sky approach. That means something is missing in his logical makeup.

And finally, our tenet was "If you do business with us, we won't recruit from you." If the recruiting firm in question is actually capable of removing people from your staff, then you should use them for your own good — for something is awry in your shop.

As for ethics, there are some shoddy operators out there — your best bet is to circulate the facts among your compatriots at work and in your trade organizations. These operators need to be put out of business, and your efforts will help.

John Luce
Product Services

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One-Sided Question

Regarding the editorial "Don't Quote Me" [CW, Aug. 9] and J. Socha's letter [CW, Aug. 23]:

The editorial expresses concern over the hesitancy of DP managers to share publicly the problems they have had in dealing with accounting firms that provide both audit and nonaudit services. The editorial begins with the hypothesis that mixing auditing and consulting services yields a more potent combination than providing the same services by two different firms: I'd be extremely interested in finding out how *Computerworld* arrived at that theory.

I doubt that any accounting firm has the influence with which you seem to imbue them. Certainly, they have no more than any consulting firm in the same situation.

I refer both Socha and *Computerworld* to the American Institute of Certified Public Accountants Professional Standards, Volume 1, MS Section 101.06, which lists the standards governing management advisory services. Standard No. 1 states: "In performing management advisory services, a practitioner must act with integrity and objectivity and be independent in mental attitude." Standard No. 7 states: "Sufficient relevant data is to be obtained, documented and evaluated in developing conclusions and recommendations."

The rather one-sided question put to DP managers (with respect to their "experiences dealing with independent accounting firms that provide both auditing and nonauditing services") does not go far toward developing a factual basis for conclusions; why not ask how many DPs have been fired because of a consultant. Then break that figure down by audit and nonaudit consultants and compare that number to those who have been fired for any reason to get an idea of the size of the "problem."

Stephen D. Evans

Renlo, Nev.

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CW/10-25

The customer service software people

Needed: Common Security Technique

By Robert Bilyeu

Special to CW

As blue- and white-collar crime have increased in recent years, so has the concern for security in all aspects of the corporate environment. It is not uncommon to see headlines regarding a new crime where an employee of a large corporation managed to embezzle several hundred thousand dollars or destroy some valuable information via a computer terminal.

The security of a modern computer system must be viewed on different levels. Three of these levels are hardware, software and personnel.

Many companies consider one of these categories, but fail to integrate all three.

How do we protect modern on-line real-time computer systems from theft, malicious mischief and accidental modification? This is the dilemma facing auditors today. Bilyeu describes the complexities of the available solutions to this question.

This article addresses the second category.

Most on-line, real-time applications need some degree of security. Sometimes this security is redeveloped as a part of each new application as it is designed and coded. However, in many

cases, it is left out completely or tacked on later as an afterthought. To eliminate the overhead of redevelopment and the inconsistency of many different security techniques across several computer applications (for example, payroll, inventory and purchasing), a common security technique that will interface with and protect all or the majority of the applications should be installed.

The goal of such a security system is twofold: preventing abuse of the system before and as it is being attempted and providing an audit trail and warning system that allows tracking and identification of abuse. Such systems

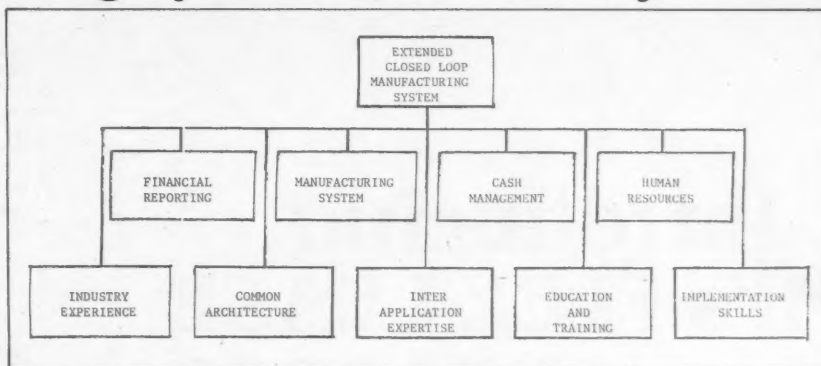
(Continued on Page 54)

Manufacturing System Unveiled by MSA

ATLANTA — An integrated Extended Closed Loop Manufacturing System that includes business application systems, manufacturing components and service components has been unveiled by Management Science America, Inc. (MSA).

The software is comprised of modules (see chart) intended for users of IBM 370, 4300, 30 series, 3080 and compatible mainframes running under OS and DOS.

The manufacturing modules currently available include manufacturing standards, inventory records control, historical forecasting, master production scheduling, material requirements planning, capacity requirements planning, shop floor control, procurement



Modules of MSA's Manufacturing System

management and cost management systems. The vendor noted that these systems are sup-

ported for IBM DL/1 and IMS data base management systems (DBMS) as well as for Cincom

Systems, Inc.'s Total and Cul-linane Database Systems, Inc.'s IDMS DBMS.

The Extended Closed Loop Manufacturing System will include MSA's Easy-Screen screen generator as well as its Help on-line problem solving support utility.

MSA's material requirements planning reportedly provides time-phased requirements for materials based on the master production scheduling, the vendor said. Capacity requirements planning reportedly establishes the equipment and resources needed based on an organization's overall product plan and schedule.

Shop floor control is designed

(Continued on Page 54)

CSU Introduces Series

First-Time 370, 4300 Users Get Aids

MEMPHIS, Tenn. — Computer Software Unlimited, Inc. (CSU) has introduced a set of software packages for first-time users of IBM 370 and 4300 processors.

The first package in the series is a customized, user-oriented front end for the DOS/VS Release 34 operating system to optimize use of CSU's other products — Harold: TP Monitor and Marion: the On-Line Librarian.

The Harold product was designed to support both Marion and user-written, on-line applications in either assembler or Cobol. It reportedly simplifies the development of on-line applications.

The Marion product's procedural language (which is not new, but was not previously available with this particular package) reportedly takes the complexity out of DOS/VS job-

stream, and its Power V/S interface allows operation in a cardless environment, according to CSU.

This complete batch and on-line software system rents for \$402/mo. The purchase price of Marion is \$8,000, Harold costs \$2,000 and the DOS/VS front-end environment is free from CSU, which is located at 1806 Malabar Drive, Memphis, Tenn. 38138.

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10/82

SOFTWARE & SERVICES

Common Security Method Avoids Redundancy

(Continued from Page 53)

should be designed as applications programs and not contain any hooks or modifications to the operating system or base software of the teleprocessing monitor. This reduces or eliminates maintenance overhead by the system programming staff once the package is installed. All source code should be provided to the customer if the system is purchased as opposed to in-house development. Since such a system would be likely to affect a large portion of a company's teleprocessing applications, it is not desirable to be at the mercy of an outside vendor when problems arise. Therefore, possession of all source code is essential.

This source should, if possible, be

designed and written in a common language that is understood by the proper staff. It should be in a separate library or in some way protected from unauthorized access. Its structure should be designed so that a study of it would not allow easy breach of the security — in other words, the system should be based on dynamic values that are not revealed by the code. These values should be held separately and composed not part of the source code.

The system should provide a unique identification for each individual allowed to use it. Part or all of this identification should be secret. The assignment of a secret password that is changed periodically is desirable. The system should monitor the

use of those passwords and provide warnings and lockouts if they are abused. Passwords should also be scrambled or encrypted when possible to avoid inadvertent discovery. Portions of the files or tables will certainly be present in the computer during operation and/or the information could be revealed in a core dump if not protected.

A log or audit trail of all or selected transactions should be provided. This should be monitored by the appropriate people. Warning messages should be routed to this log or to a terminal monitored by a responsible person any time the protected system is in use. In most facilities, a "security administrator" position is created. This person maintains the informa-

tion necessary to run the security system and does the necessary follow-up work when a breach is suspected. This follow-up — a phone call or personal visit — becomes one of the strongest deterrents to abuse from within the company. If the security administrator monitors the use of the system and makes periodic visits or calls, the users learn that the system's use is under close scrutiny. The news of this scrutiny spreads like wildfire among users.

The terminals on the network should be protected by time of day and should have an automatic log-off or time-out, in case the user leaves the area without logging off. The system should also provide protection of the transactions by each user.

Maintenance of the security system by the administrator should be on-line real-time. The network should not have to be taken down to make changes. No off-line assemblies should be necessary. This provides an easy solution to crisis problems such as new employees or forgotten passwords.

A common security containing at least the characteristics described here will allow coordination of security in all three areas — hardware, software and personnel. This arrangement provides an effective approach to the protection of corporate computer resources.

Bilyeu, president of System, Inc., is a Decatur, Ill.-based consultant specializing in CICS and IMS teleprocessing applications. He is the author of *Patrol/CICS*, an on-line, real-time security system designed to operate in an IBM CICS environment.

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System Targets Manufacturing

(Continued from Page 53)

to monitor actual manufacturing activity against the plan and highlight variances and their possible effects on specific operations. Procurement management monitors the status of purchased materials from the time they are requisitioned, and cost management, which is still under development, will capture the actual costs at various levels during the manufacturing process and compare them to the planned costs for each product.

The manufacturing standards module is said to provide part identification, bill of materials, routing and work center identification. Inventory records control provides on-hand and on-order information for all defined parts.

The entire system consists of 18 modules, which are priced between \$30,000 and \$50,000 per module. According to the vendor, a typical customer's configuration might run between \$300,000 and \$400,000, depending on the number and type of modules selected.

The manufacturing and financial components are already available, according to the vendor, while the integration process is still under development and scheduled for completion during the second half of 1983.

Further information can be obtained from MSA at 3445 Peachtree Road N.E., Atlanta, Ga. 30326.

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CARLISLE

Data Encryption Tool Out for IBM 370 Users

DOWNERS GROVE, Ill. — Data encryption software that reportedly protects sensitive data from unauthorized disclosure and prevents false data from being inserted unnoticed has been unveiled here by Circle Software Corp. The product operates on any IBM 370 or compatible mainframe running under MVS or OS/VS1.

C-Cryptic reportedly protects entire files or critical sections and can convert data into a cipher that has no re-

semblance to the original information. As data is being entered, it goes through an encryption process; as it is retrieved, it is decrypted.

C-Cryptic, which is being offered with high-level interfaces for Cobol, PL/I and Fortran programs, is priced at \$7,960 from Circle Software, Suite 240, 1100 31st St., Downers Grove, Ill. 60515.

Mapping Aid Bows for CICS

SAN ANTONIO, Texas — Software designed to enhance CICS map-writing productivity has been released here by Deva Systems Software, Inc.

Map-Manager interfaces with appropriate IBM software to provide an on-line aid in producing CICS maps and reduce programming time. No modifications to IBM software are necessary because Map-Manager is integrated with IBM's Display Management System, Conversational Monitor System and Basic Mapping Support System, enabling inexperienced programmers to define and format screens interactively, the vendor said.

The package supports Cobol, assembler and PL/I map definition and also features immediate printout of maps as documentation aids. It is priced at \$3,000.

Deva Systems is at Suite 220, 4414 Centerview Drive, San Antonio, Texas 78228.

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Update Package Aids Vsam, DL/1 Users

PLYMOUTH, Minn. — A software package for on-line retrieval and update of IBM Vsam files and DL/1 data base segments has been announced here by MBI Systems, Inc.

Fast Inquiry Data On-line (Fido) runs in IBM and plug-compatible environments under DOS/VS(E) and requires CICS; it is not dependent on a specific release of the operating environment of DL/1, MBI Systems said.

It reportedly provides productivity gains in program development and maintenance over that of existing development

aids. Fido displays Vsam records or DL/1 data base segments in character and hexadecimal format, the vendor said. The package has the capability of updating up to 300 characters of retrieval data on a single screen and it supports forward and backward browsing. Security features include the ability to limit access and/or update functions by user.

The base system is available for \$2,200 and the DL/1 interface module costs an additional \$900. Further details are available from MBI at Suite 100, 3030 Harbor Lane, Plymouth, Minn. 55441.



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"I meant to back it up first thing this morning..."

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Includes 70 Additional Features

'Natural' Version 1.2 Gets Full Screen Editor

RESTON, Va. — Software AG of North America, Inc. has unveiled an enhanced version of its Natural on-line application development software that is said to include more than 70 additional features.

Natural Version 1.2 runs on IBM and plug-compatible systems under OS or DOS operating systems, as well as under the CMS component

of the VM/370 operating environment.

Among the enhanced features of the product are support for new terminal types, a full screen editor and the capability of generating screen maps independent of programs, the vendor noted.

In addition, an on-line help system has been added, and a dynamic program generation feature is intended to allow

users to create their own one-time queries and reports from predetermined menu screens.

For the data base administrator, utilities are provided for monitoring and controlling Natural system usage with increased security, the vendor added. Facilities also are provided for modifying on-line help and error diagnostic screens to meet indi-

vidual user needs.

Natural Version 1.2 is being distributed free to all existing Natural customers. For new customers, the price of the product starts at \$40,000 for DOS users and \$50,000 for OS users.

Further information is available from Software AG, which is located at 11800 Sunrise Valley Drive, Reston, Va. 22091.

'Dras' Targeted For CICS

LATHAM, N.Y. — Mechanical Technology, Inc. has introduced its Dynamic Resource Allocation System (Dras) for IBM's CICS. It is said to enable a user running an application program to determine what resources should be used based on an operator ID or terminal ID.

CICS/Dras allows two or more users to access separate files or data bases but still use the same application program, a spokesman claimed. In this way, the application programs stay the same, CPU overhead does not increase, only one CICS partition machine or region is necessary and test and production environments for simultaneous operation can be set up, he said.

A query feature assists in the debugging of new programs and validates changes made to the CICS/Dras table, the company added.

CICS/Dras' price of \$6,500 includes one year's maintenance. Mechanical Technology is at 968 Albany Shaker Road, Latham, N.Y. 12110.

Finance Aid Gets Boost

PHOENIX — Independent Computer Systems, Inc. has announced a series of enhancements to its financial management system for Honeywell, Inc. Level6/DPS 6 processors.

The financial management system consists of nine on-line interactive general accounting modules. Enhancements include a budget capability, simultaneous cash or accrual accounting, report-generating capabilities, a spreadsheet interface and improved audit and spooler capabilities.

The financial package runs under the Gcos operating system and costs \$30,000 from 8686 N. Central, First Floor, Phoenix, Ariz. 85020.



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Software Products Unveiled at Info

NEW YORK — The following were among the wide variety of software products unveiled at the recent International Information Management Exposition and Conference here:

- R. Shriver Associates introduced updates, including a rapid cash application feature and multicompany capabilities, to its Direct/3000 family of financial software designed for Hewlett-Packard Co. HP 3000 processors.

These improvements will be avail-

able in the first quarter of 1983.

- If purchased before Dec. 1, the software packages will be available for \$12,000/module, the vendor said from 1259 Rt. 46, Building 2, Parsippany, N.J. 07054.

- Datapro Research Corp. unveiled its two-volume *Management of Small Computer Systems* service, which is available at a prepublication price of \$310.

This offer is \$50 less than the regular subscription rate. Datapro is located at 1805 Underwood Blvd., Delran,

N.J. 08075.

- Selwyn & Associates unveiled Space Tablet/Space Graphics, a computer-aided design system for IBM and Apple Computer, Inc. microcomputers, and Space Communications graphics software for the IBM Personal Computer.

The Space Tablet/Space Graphics package is priced under \$2,000, and Space Communications is available for \$500, the vendor said from Suite 206, 630 Oakwood Ave., West Hartford, Conn. 06110.

System/38 Users Get Stat Modules

MCLEAN, Va. — ACS Systems, Inc. has statistical subroutine modules in object code for IBM's System/38.

The subroutine reportedly can be incorporated into RPG-III or Cobol code to speed programming. The modules will generate natural log functions and mean and standard deviation for members of a set.

The package costs \$500, available with code on diskette for a 30-day trial. ACS Systems is at 8260 Greensboro Drive, McLean, Va. 22102.

1982 FALL AUDIT SEMINAR SCHEDULE

Albuquerque, NM	Nov. 18
Atlanta, GA	Dec. 9
Baltimore, MD	Oct. 28
Birmingham, AL	Nov. 9
Boston, MA	Nov. 4
Boston, MA	Nov. 17
Buffalo, NY	Dec. 2
Chicago, IL	Dec. 1
Columbia, SC	Dec. 14
Ft. Lauderdale, FL	Nov. 10
Grand Rapids, MI	Nov. 18
Greenville, SC	Nov. 16
Harrisburg, PA	Dec. 2
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On-Line Display Capability Added to 'System/Manager'

BOSTON — An on-line display capability has been added to the System/Manager resource management system from Corodale, Inc.

The system can be used in IBM mainframe and plug-compatible environments under DOS/VS or DOS/VSE. Both facilities run under CICS and Altergo Products, Inc.'s Shadow II teleprocessing monitors.

Systems Utility Out for Users Of NCR Minis

MISSION VIEJO, Calif. — A new systems utility for users of NCR Corp. computers has been released here by Capricorn Computing, Inc.

Magic provides users of NCR N and V systems with a replacement for many NCR utilities including Direct, MTPRNT, PRNTDISC, TRKIX and Spurlist, as well as selected functions of other utilities, according to the vendor. This product will function on any N-mode processor with a minimum of 64K bytes of memory and in any VRX system environment. Magic fully supports NCR extended disk addressing techniques and is compatible with both B-series and computer-aided manufacturing file types.

A perpetual license for Magic is \$2,200. Capricorn Computing is located at 23866 Via Calzada, Mission Viejo, Calif. 92691.

'Create' Update Fits DG CPUs

HORSHAM, Pa. — Complete Computer Systems has unveiled a new version of its Create data base management/report generation/word processing software for Data General Corp.'s Micronova and Microclipse computers.

This product reportedly enables novices to set up new systems, maintain files and generate multifile reports. It also interfaces with the text of computer-stored correspondence. Create sets up new data bases as fast as users can type in the name and format, according to the vendor. Some of the systems that can be implemented without any programming include mail order, library management, subscription fulfillment and brokers/agents.

Create costs between \$7,000 and \$20,000, depending on options selected and operating system. Complete Computer Systems said from 159 Gibraltar Road, Horsham, Pa. 19044.



'Go Get 'Em, Tiger!'

Known as Online Display Facility, the optional feature enables the system administrator to gain an immediate picture of disk and file resource usage, according to the vendor. In addition, where an installation is running under VM, a further facility is available, known as the Virtual Console Facility. This allows any CRT under the control of the teleprocessing monitor to act as a VM console and to issue control program commands to the virtual machine under which the teleprocessing monitor is executing.

The options cost \$1,500 and the vendor is based at 211 Congress St., Boston, Mass. 02110.

Patient Accounting Package Fits IBM Systems Under MVS, DOS

CINCINNATI — PCI Systems, Inc. has announced a patient accounting package as the latest addition to the company's Patient Management Applications System, designed for IBM systems running under MVS or DOS.

The patient accounting package complements the company's admissions and order management packages and is an on-line data base-oriented, in-patient and out-patient billing and accounts receivable management application offering, the company said.

The accounting package is said to utilize the architectural capabilities of IBM's Patient Care and Ap-

plication Development. These capabilities have been used to implement design concepts such as a generalized output processor, a data base design that accommodates known requirements and anticipates future needs, and the company's Worklist, a work management subsystem, the vendor claimed.

The Patient Management Applications System accounting package is priced at \$250,000, with shipments available in the second quarter of 1983.

PCI Systems is located at 1527 Madison Road, Cincinnati, Ohio 45206.



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Xerox Division Restructuring Prices

LOS ANGELES — Xerox Computer Services, a division of Xerox Corp., has announced a restructuring of its processing and technical support charges, featuring long-term discounts, earned credits on software licenses and reduced installation fees. The new pricing will start in January.

A price ceiling will be established for each customer biannually, based on actual processing averages over the previous six months. The ceiling is set at 110% of the average, limiting a customer's cost liability regardless of how much processing is used.

Technical support and consulting prices have been unbundled from processing charges, reportedly allowing customers to choose only those support services they need.

Under the plan, computer services customers can earn credits toward licensing Xerox applications software to run on in-house computers. Ten percent of monthly processing charges will accrue as a credit toward the software license fee.

Credits up to 30% of the fee may be applied to Xerox's Spectra software for IBM mainframes and up to 15% to the firm's Praxa for Digital Equipment Corp. computers. Discounts of 5% to 15% are available on service agreements of two years or more.

Further reductions have been made on communications charges, terminal printing, use of certain utilities programs and installation of additional applications, Xerox Computer Services said from 5310 Beethoven St., Los Angeles, Calif. 90066.

PDP-11 Users Get 'Tables-II'

CHESTNUT HILL, Mass. — A generalized software package for creating and maintaining table files and for accessing them from user-written Basic-Plus programs is now available from Datacraft.

Tables-II was designed for use on Digital Equipment Corp. PDP-11 systems under RSTS/E and CTS-500 operating systems. The product can reportedly save time and money by standardizing table maintenance and look-up procedures, thus speeding program development.

The single-unit perpetual license fee for Tables-II is \$995, and further details are available from the vendor through P.O. Box 292, Chestnut Hill, Mass 02167.

'Arsap' Updated To Fit VAX/VMS V3.0

RIVERDALE, Md. — Gejac, Inc. has updated its Arsap Resource Management and Chargeback System to run on Digital Equipment Corp.'s recently announced VAX/VMS V3.0 operating system.

Arsap is also available for other DEC operating systems, including RSX-11M and RSX-11M-Plus. An RSTS version will be available later this year, a spokeswoman said.

Arsap is a comprehensive computer resource management system. Major capabilities include project accounting, terminal accounting, system utilization and invoicing, the spokeswoman said. Arsap can produce itemized invoices automatically for cost allocation and can be used for departmental budgeting.

Arsap for VAX/VMS is available for \$3,995. The company can be reached through P.O. Box 188, Riverdale, Md. 20737.

'Catchit' Aids Documentation

PROVO, Utah — A documentation tool said to allow users of Digital Equipment Corp. VAX-11 systems to achieve accurate and reliable run examples while executing interactive tasks has been announced by Clyde Digital Systems, Inc.

Catchit features a command set of eight control characters, allowing all terminal input and computer output to be captured in the log file, the company said. All user input is underlined as well, while the package catches all terminal I/O that comes through, the vendor claimed.

The package can be used for audit trails, user documentation or detecting errors when documenting programs, and users have the capability of inserting descriptive text into the log file with no effect on the current session, the company said.

Catchit is priced at \$600 from Clyde Digital Systems, 3707 N. Canyon Road, Provo, Utah 84604.

Accounting System Fits System/34, 38

ROCKPORT, Mass. — Para Research, Inc. has announced an automated project control system for the IBM System/34 and System/38.

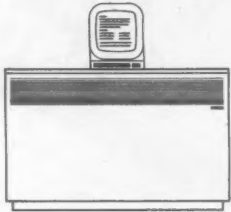
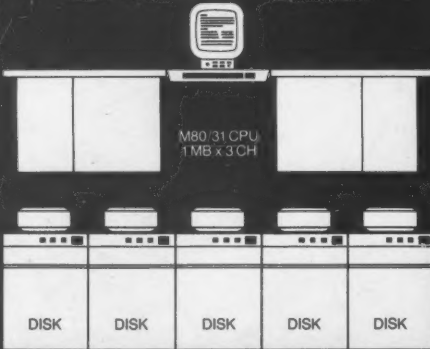
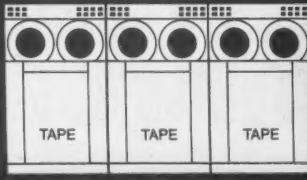
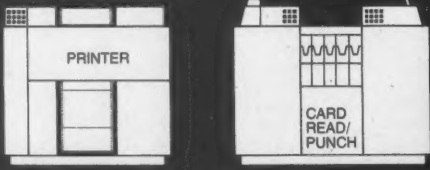
Project Planner Accounting System reportedly gathers and reports project progress in as many as eight hierarchical levels with minimum user involvement. The software generates a variety of reports that allow management to plan, monitor and control actual vs. scheduled work in progress, based on elapsed time and dates, according to the vendor.

The software features simple input and maintenance of data, including company work hours, projects and employee assignments, enabling managers to project costs for labor, computer expenses, travel and entertainment, the vendor claimed.

The Project Planner Accounting System costs \$3,000. Further details are available from the vendor at Whistlestop Mall, Rockport, Mass. 01966.

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Methodologies may come in and out of fashion, but some things never change. A systems analyst with two decades' experience has this advice: "Get back to basics."

Commonsense Systems Analysis



BY ROBERT E. LESLIE

A considerable number of systems analysts and managers are confused on the subject of software development. Many have been thrown off the natural trail of their common sense by quick and easy teaching methods that substitute form for content, bookkeeping methodologies for the real analytic process.

Knowing how to organize documentation and finding new uses for the flowcharting template are not enough. Methodology is important,

but the true work of systems analysis requires individual or group creativity, using mature judgment and experience.

The goal of systems development is to deliver useful end products in a reasonable span of time. Appropriate analysis is the heart of this process.

Now, in light of new software technology and methodologies designed to speed and simplify the development process, the time has come for

IN DEPTH

a corrective swing to a middle path.

How do we analyze a system?

Rule No. 1: All systems exhibit the same basic laws and are subject to basic methods of analysis. An analyst who has studied and reformulated three warehouse systems will have to suffer a period of intense education before understanding the banking business, but will eventually see that inducing people to park their money in the bank, which then lends it to other people at a net profit, is not so dissimilar to warehousing. It is all puts and takes, after all.

Below is a list of 24 commonsense

steps in the systems analysis process, which we will describe in detail. It looks like a massive work load, but there are also sharks lurking below the surface.

For instance, knowing resources will come down to knowing people and knowing data and how data is stored. In a large corporate system where the data resource has not already been sufficiently examined, understanding it can be a big job and hard to bound within a single corporate activity.

Data analysis on the corporate level may warrant the full-time concentra-

tion of systems analysts on the non-process corporate level for a period of time in order to block out the main data groupings or entities and establish a corporate data game plan. From that point, data and data storage nowadays involve specialists

such as data base administrators, even in the early analysis stages.

1. Management support.

The systems analyst will not always find himself in a totally friendly situation. (Continued on In Depth/4)

Step by Step

The following steps must be covered in analyzing a system:

1. Get sufficient management support.
2. Identify the system goals.

3. Isolate and set boundaries for the system to be studied.

4. Decide the nature of the system. Decision support? Operational? A mix of both?

5. Know all forms of input.

6. Know all forms of output.

7. Know all the triggers.

8. Know all the messages.

9. Know all the resources (data, people and other).

10. Know all the activities.

11. Know each activity's operations.

12. Know each operation's processes.

13. Know the balance between the needs for equilibrium and throughput efficiency (an inherent conflict of goals).

14. Know the role players' responsibilities and jurisdictions.

15. Know how to interview for information gathering.

16. Know how to interview for the dialectic synthesis of ideas (to be explained).

17. Know how the system fits together as one gestalt (integrated whole).

18. Allow for the sudden insight (the AHA!) to come either during the dialectic interview with the user or as you inspire him to try for a new view by himself.

19. Understand problems of systems dysfunction such as the one mentioned in 13.

20. Form a working hypothesis on what the system needs to be to achieve its goals in the ideal way.

21. Keep testing your hypothesis inductively against the emerging facts of the study and keep deductively reformulating your hypothesis.

22. Be prepared to compromise your "last" hypothesis to conform to technological and political realities.

23. Reformulate requirements in close cooperation with the user.

24. Write your study laying out the present system (to the extent that needs doing), showing findings and opportunities. This study might also include a requirements analysis, a description of a solution and a cost/benefit analysis. How far you go in this phase of system development depends on a number of factors and is a matter of good judgment.

As a general rule, it is better to go far rather than stop short, especially if the scope of the system is not overwhelming. The longer the process is dragged out, the more chance for failure because of political considerations or the "too many cooks" syndrome.

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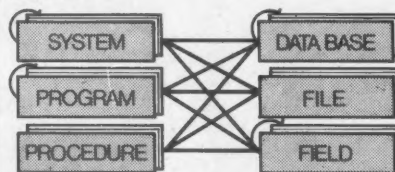
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What Makes a System a System?

What we discuss here are natural, open-end, steady-state systems. Thus defined, a system is not a pile of odds and ends thrown together — banana peels and end tables and tin cans and plastic bags and old magazines all heaped in a mound. In this pile, a banana peel can be removed without disturbing the structure of the pile. The addition of an empty beer can changes the quantity but not the quality of the pile.

Items in the pile bear no dynamic organizational relationships to each other. The pile is not self-maintaining, does not heal itself, does not replicate itself and does not go through evolutionary stages. It is not a whole or, using another word, a system. It is just a random pile.

Another arrangement of relationships that fails to meet the qualifications of our definition of a natural system is a mechanical device, such as a toaster or a robot. These system devices have similarities to natural systems in that they may be part of a suprasystem and can be comprised of subsystems. However, in a natural system, nothing is removable without changing the whole system. Remove or alter any element of the chemical code in the chromosome and something quite different results.

A natural, open-end, steady-state system — like your Uncle Joe's liver, the person across the street, your softball team or the telephone company — is comprised of resources impelled by triggers to engage in activities that have the following goals:

1. Maintaining a dynamic equilibrium.
2. Processing input into output according to a plan.

These activities have one or many operations and each operation has one or many processing steps. Operations are set off by triggers (the payroll checks are printed every Thursday at 2 p.m.).

Dynamic Equilibrium

A natural system is an organized whole, with each part related organizationally to the other parts. This natural organization does not vary, is not reducible, maintains itself despite environmental change, creates new selfhoods in evolutionary terms in response to environmental impetus and is a relational part of a hierarchy of organized subsystems and suprasystems. And to repeat, the goal of this marvelous construction is dynamic equilibrium or input processing. Figure 1 shows a model of such a system.

It is important to note here that it is the role of the resource in the system that is unvarying, not the present role occupant. For instance, the order clerk in a bakery who collects requests from 50 route salesmen and

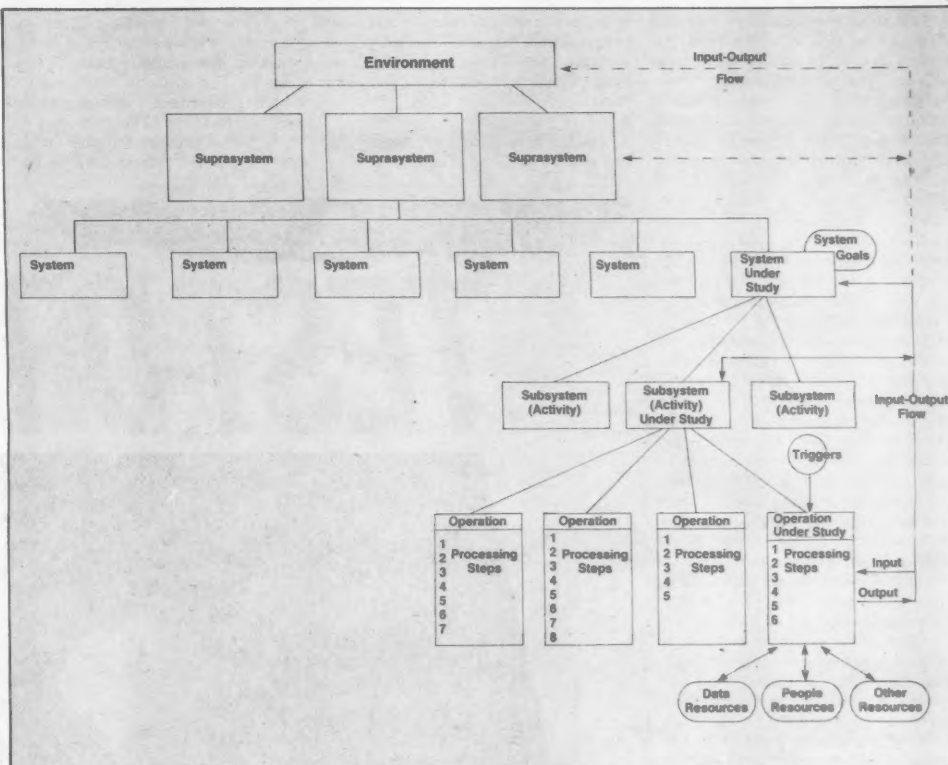


Figure 1. Systems Model

constructs the bake order may retire with a gold watch, but a replacement for that task is at the order clerk's desk the next day or the bakery will shut down. You may replace the pitcher on your softball team in the fifth inning. But if you eliminate the role of pitcher, can you still play baseball?

Perhaps a quiz would reinforce the points already made. Which of the following are natural systems (as opposed to mechanical systems or piles)?

1. An atom.
2. A molecule.
3. A cell.
4. An organ such as the liver.
5. The cardiovascular system.
6. A bluefish.
7. A human being.
8. A family.
9. A town.
10. A bakery.
11. A bank.
12. The IRS.
13. The United Nations.
14. A guided missile with onboard microcomputer.
15. A bag full of empty bottles and cans.
16. A recycling center for newspapers, empty bottles and empty cans.
17. The telephone company Long Lines Division.

18. A mouse.
19. All the mice in Maryland.
20. A method for winning blackjack.

All are natural systems except 14, 15, 19 and 20. (For instance, a guided missile is a mechanical system. All the mice in Maryland are a pile of mice.)

The rest are true natural systems, all following the same rules of system organization. A cell has inputs and outputs, triggers and resources and engages in activities such as maintenance. It has molecular subsystems and an organ as suprasystem. It has equilibrium, a life cycle, exists in a hierarchy, maintains itself in a changing environment and so forth.

Qualifying Factors

An atom or molecule may or may not be living, but they are certainly natural systems.

The same exactly can be said for the bakery, which has the goal of making fresh bread and cake for profit. There are such resources as order takers, information on customer orders, schedule makers, bakers, delivery trucks, pots and pans and ovens. The input to the system consists of the orders for the next day, raw materials such as flour, leavening, poppy seeds, shortening, salt, water, sugar

and waxed paper.

There are activities such as mixing, molding, baking, wrapping, delivering and money collection, all performed to the master information plan concerning the sum of all orders and all capacities. The output is white bread, rye bread, Kaiser rolls, crumbs, apple cakes, bagels and jelly doughnuts. The bakery cannot function without the bake ovens, and it plans to be around for a long time as a stable organization. The bakery would like to grow and maybe even start a little bakery in another city.

What is of some interest to the analyst is that human resources can be replaced by devices, and as long as there is still a human component, the system is natural. In point of fact, one of the functions of the systems analyst, for better or for worse, is to look constantly to replace humans with devices while still retaining a natural system.

The systems analyst must see the similarities among all natural systems and be able to move quickly into a rather complete understanding of the particular system at hand. This ability often amazes the operator of the system, such as a department manager, who assumes that it will take at least five years to understand his operational system.

IN DEPTH

(Continued from In Depth/2)

ation when working with users on large projects that have the potential to disturb the equilibrium of the system or suprasystem. A major study leading to activity reformulation and requiring a full disclosure of resources is usually disturbing to people responsible for operations.

A possible system redesign across jurisdictional departments is doubly threatening. These jurisdictions usually think of themselves as complete systems and have well-developed immune functions to repel the "attacker." They have in most cases grown into hierarchies with subsystems and, with each level of evolving complexity, the managers may have been rewarded just for managing complexity, let alone for productivity. The person who was the supervisor in the old days became the manager and is now the group manager.

What should drive systems — be they living organisms or human-directed systems — is the process by which the inputs are converted to outputs. The resources of the system, including the people, should contract and change and expand and dissolve, without blame or stress, according to the exigencies of the I/O processing. This, as we know from old wounds and new bruises, is rarely the case. After all, it goes against the basic goals of living systems to contract or dissolve — unless a higher systems authority intervenes.

In order, then, for the systems analysis to succeed, some higher level director in the process must will it in no uncertain terms. For large studies, this means that the CEO and the executive committee must actively enlist the full support of the organization. Nothing less will do.

For instance, if the systems problem crosses the jurisdiction of the marketing, finance and manufacturing divisions, a written mandate from the marketing vice-president will not do. The mandate must come from all senior management acting together through the CEO. The analyst must be given full access to all the information about all the resources in the study area, including financial information.

The point is that effective, broadly scoped systems analysis cannot be conducted without high-level sponsorship and full access. In addition, it is imperative that the systems analysts maintain confidentiality, stay nonpolitical, act with integrity and honesty and inspire confidence. Such behavior is vital to the project's success.

2. Isolating, scoping and classifying the system to be studied.

Before proceeding with a study, it is necessary to know whether the problem requires a radical reexamination of a system or a minor fix to a satisfactory system.

Isolation and classification are not necessary with a minor fix. In this situation, the whole process is compressed. The systems analyst meets with the department manager to discuss the problem. The problem may be a new, rather complex report needed by the accounting depart-

ment that uses data already in the corporate data base but not visible through the user's logical view of the data base. The analyst will quickly dispose of this problem with a minimum of analysis. The time involved to identify the problem, construct a solution, arrange for an enhanced user view of the data, write the report and update the documentation may be only a few hours.

On the other hand, the problem may be much larger in scope. Per-

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IN DEPTH

haps it is an automated marketing and Class A MRP-II (manufacturing resource planning) system that management believes it needs to replace a labor-intensive, error-prone, manual system covering many departments.

This is a big project and needs to be outlined. A system study across many activities and departments is surely indicated, but how do we set the boundaries? Do we include financial information concerning sales

'Setting the wrong scope for a project can result in profound mistakes in systems development. The most serious error is setting off too small a system for analysis and leaving out the mainspring.'

analysis and sales forecasting? Do we include shop floor control? What about the needs for raw material ordering and storage? What about the

creative people at the front end of the system and their needs for information? What about decision support for sales conferences out of town?

Now we see business systems analysis in the real world, where clean-cut definitions of a system, while still valid, become more complex. Some systems have more than one suprasystem as well as more than one subsystem. Because of the input-output data flow, which tends to go off in all directions through the whole corporation across all activities, it is hard to tell where to stop packaging activities into a system.

In order to get results, we may have to be pragmatic about how we set boundaries for activities. This arbitrary inclusion-exclusion process is quite necessary. Setting the wrong scope for a project can result in profound mistakes in systems development. The most serious error is setting off too small a system for analysis and leaving out the mainspring. If you set boundaries around too large a system, you can always analyze it in stages, top down and critical path first, and perhaps produce good results.

A corporate strategic plan that lays out the architecture for system development over a number of years is most useful in the process of setting boundaries. However, it is important not to use this strategic plan in a deterministic way but rather as a guideline.

Classifying the System

The ancient Chinese had a philosophy based on the unity of opposites. One opposite, the negative polarity, they called yin; the other, the positive polarity, they called yang. The process by which you find your perfect place between the two polarities at every changing point in time they called the sense of Tao (the Way).

Perhaps we could use this concept as a helpful metaphor. In system development, there are many yin/yangs. One involves classifying systems. Decision support systems (DSS) may be called yin systems and operational systems, yang systems. Any number of points might exist on the line between the two.

All operational systems have some decision support functions and vice-versa. It is vitally important for the analyst to know where the system under study falls on this continuum. Knowing this is the Tao of systems analysis.

A DSS is about the business. An operational system is the business. The information processing in a bank or an insurance company is clearly the business. A real-time system such as oil refinery processing of crude to gasoline under information control is the business.

Quantitative information spun off from this process is the decision support element. Decision support systems give managers and others necessary information about the process. This distilled, quantified information, off-line from the operation, is used to support decision making. How are the salespeople doing in the Southeast? What are the volume

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and quality of work being done in the shop on the new machines? What inventory is not turning over?

In many institutions that started with computerized data processing in the '50s

and through the '60s and '70s, the operational systems are already in place and have been redone and changed many times. These operational systems are transaction-oriented with a great variety of input, master records

and output. The process flow is usually complicated and difficult to package as a general solution even for different but similar operations in the same corporation.

Now that these operational systems are in place, the focus in many corporations is turning to the implementation of more useful decision support systems. This is one of the motivations behind

the switch from batch to interactive processing, the demand for better data bases with good response time possibilities and the concentration on corporate data and effective data base management systems (DBMS).

The importance of systems classification to the systems analyst is that a very yin system is data-oriented with not much procedural flow. You capture the data accurately, store it efficiently and retrieve it in meaningful and attractive ways through good human interfaces. The documentation needed for a system like this is very much less than for an operational system.

Because of the availability of reliable, many-faceted DBMS, development time is radically reduced. The DBMS is largely self-documenting. It has now become feasible to prototype DSS as a development technique, leaving such features as computer validation until later, and, with the user actively involved in the programming (using nonprocedural languages), put a system up very quickly and modify it to the user's satisfaction. At this point, the behind-the-scenes work of validation and adding the necessary bells and whistles can be done with the knowledge that it won't all be changed by the user later.

3. Knowing the system elements; input, output, triggers, activities and resources.

This task is the meat and potatoes of the matter for the systems analyst. An experienced analyst or analyst team with proven creative talents will always solve problems well if they understand the current system well. To understand in depth, the analyst must see and understand everything in the system under study. He does this through document analysis and interviewing.

The analyst must ask for all the documentation in the department. He does this in an up-front interview after a general discussion of the department functions. No further interviews should be done until the documentation is received. The following documents must be made available:

1. The department's table of organization, with a job description for each type of employee.
2. A description of the

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nondata resources of the department, such as machines (word processors, envelope slitters, drill presses).

3. Copies of every input document received by each operation in the study area. This includes documents, no matter how informal, between operations in an activity. These must be real documents with the information filled in.

4. Copies of every output document leaving the activity area or leaving an operation within the activity area.

5. All standard message transfers whether by phone, word of mouth or paper; for instance, standard responses to phone queries in a customer service department.

6. Copies of all reports used in the department.

7. One copy of all files used in the department, no matter how informal; for instance, a list of vendors whose truck deliveries need special checking in the receiving department because of past problems. Or more formally, all user file views or data dictionary elements used in the department in its view of the corporate data base. Or a description of the manual Kardex file, including maintenance procedure.

8. A list of department triggers. For example, five minutes before the end of each shift, the machine logs are collected and sent to a terminal operator for batch data entry. Or at 8:30 every morning, all vendors scheduled to make deliveries that day are called to remind them that a delivery is expected.

9. If available, a description of all operations in the activity area, showing process detail and data involved for each operation.

Now the systems analyst must go back to his office and thrash through this documentation, struggling to make the whole apparent while achieving an understanding of the details of the area being studied. Assuming the intent of the study is not an overview but a complete understanding, this is tough work.

It is particularly at this point that a good methodology becomes important so that later, when the analyst simplifies, changes, resequences, eliminates the unnecessary and restructures the process, nothing is forgotten or lost.

The analyst will go back and interview the manager, filling in missing details and

learning processes until the moment of integration takes place inside the analyst's head and then, as soon as possible, is put onto paper. Suddenly the analyst will grasp the total nature of the

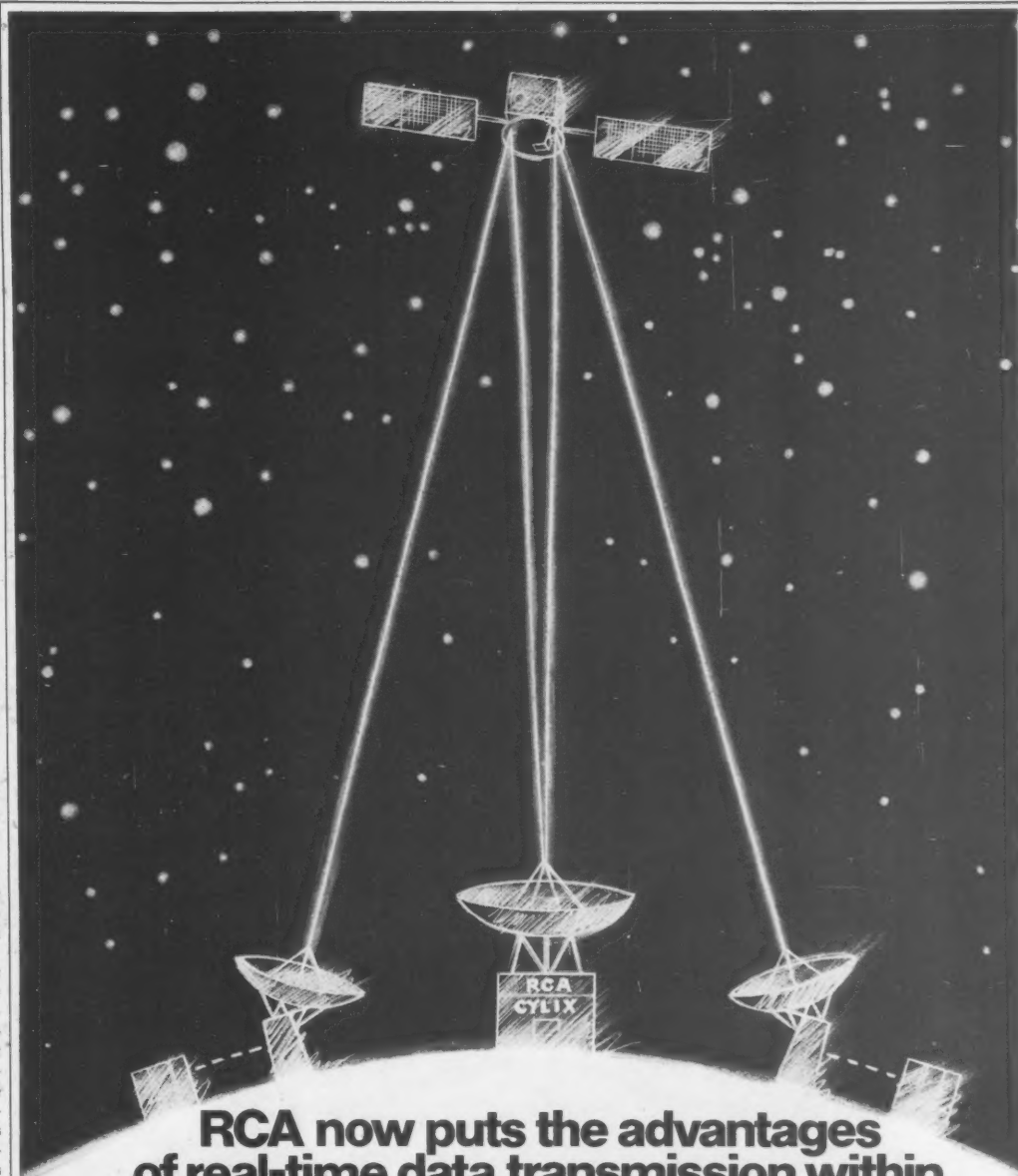
activity not only deductively, top down, but inductively, bottom up.

The analyst will then conduct interviews, moving down the three levels of the activity. Having already

worked with the manager, he will interview supervisors at the operations level and then mission workers at the process level. Do they all tell the same story? If not, why not? Find out. Also, the

analyst will interview outside activity areas that provide input and receive output.

Now the analyst knows the whole story. The truth is out. The interviewing up to now



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has consisted of asking leading questions and mostly listening. The analyst has no doubt discovered some curious anomalies: a particular report is prepared but no longer used, the machine

logs are treated as a joke by the mission workers, or the department does not have the proper resources to meet the input volume and quality has deteriorated.

By this time, the analyst has

found an individual who really knows the business activity and wants to do something about problems. Usually this is the manager. The interviewing now changes to a two-way challenging dialogue

between the analyst and this person. The analyst challenges the premises of the user and the user challenges the findings of the analyst, and out of the friendly heat of this exchange some

real ideas of how to make things better begin to pop up. This is Plato's *dialectic*, which is much less passive than the Chinese Tao.

Requirements are further revised and operations further reformulated. The user and analyst become coconspirators in a planned revolution (or at least a planned reform). The user understands that he will be the main beneficiary with the analyst, as a catalyst, soon to move into a more background, supportive role. The first step in the real creative aspect of systems analysis has been achieved.

4. The solitary work.

The analyst writes his study of the present system, including conclusions. During this time, he is also communicating with his own manager, as well as the user, getting direction and feedback. During this time of examining the present system, the analyst also does the requirements analysis and begins an introspective review of the nature of the system — whether goals are being met in the best way and what would be a perfect system.

A good analyst, always a creative person, will have sudden insights during this time, and some really good ideas should emerge by combining past experience with other systems, detailed knowledge of this system and some mysterious capacity for leaps of imagination.

Out of this process will come, besides a formal present system analysis study, a working hypothesis giving a



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more precise and perhaps revised statement of goals, a new list of requirements and perhaps a reformulated system using different resources and different operations. This material is all written

down and goes through iterations with the analyst's own manager and then with the user and on up the hierarchy of the system.

Finally, an acceptable premise for redesign is agreed

upon as operationally, economically and technically feasible. At this time, the analyst is well prepared to write a comprehensive feasibility study and proposal for a system redevelopment in-

cluding some solid cost/benefit analysis.

This, then, is the end of the opening game in systems analysis. Depending on the scope of the analysis, the next step might be further

systems analysis, but often it would be appropriate, after formal approval of the analysis, to begin the design phase of the system development cycle. It is in the work just described that the most serious mistakes are made in systems development. If the river is diverted at the headwaters, it will never reach the bay.

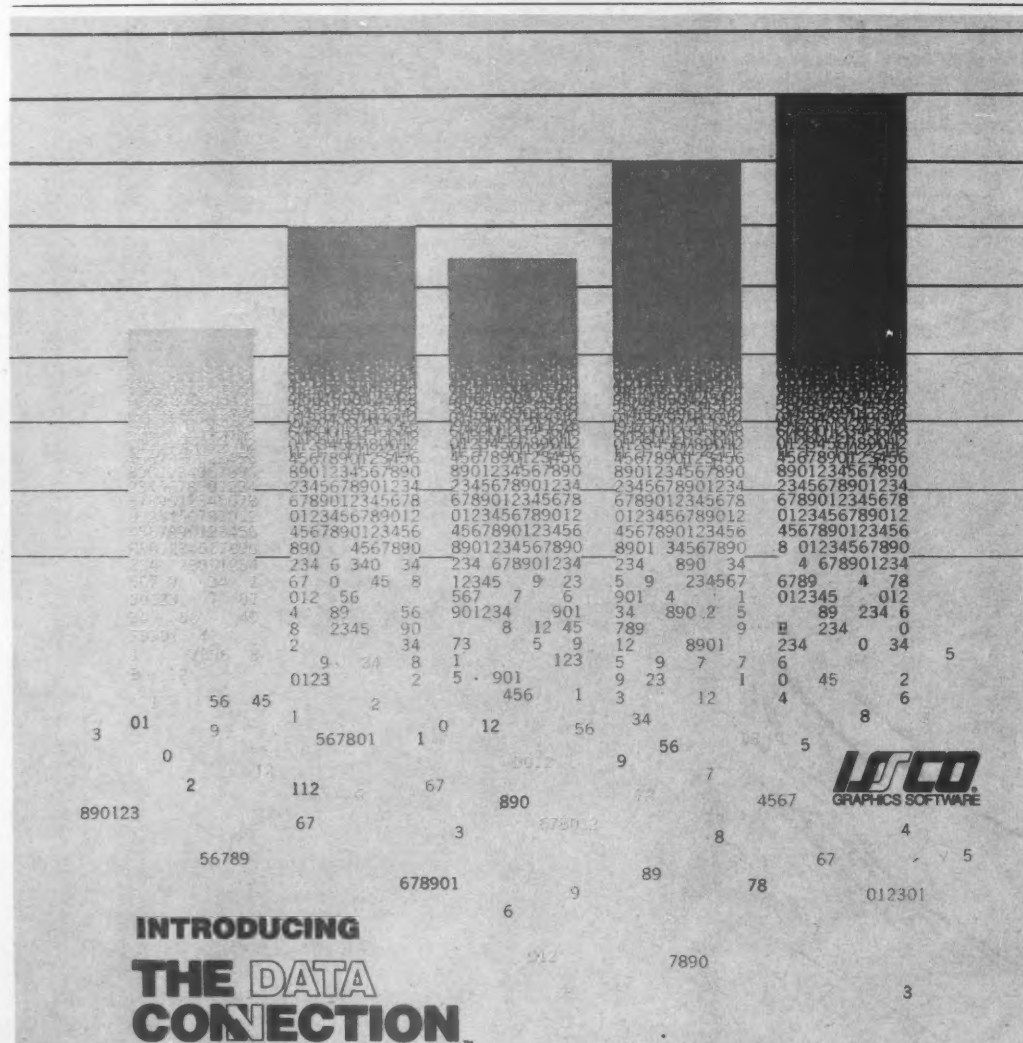
Appropriate Analysis

The decade of the '60s was a time in the information handling industry when there was a great surge of content development (delivered systems) and not much form (methodology and documentation). The period from the '70s until now has been a time of diminished content but more attention to form. By content, we mean the delivery of most of the operational systems now maintained in this country. By form, we mean advanced planning, formal analysis and attention to security, documentation, methods of storage, data descriptions, standards and protocols.

There were ostensibly a great many success stories in the '60s where entire industries such as banking, finance, insurance, manufacturing, government, retailing and communications redesigned their operating systems using computers and computer professionals. Somehow we all came through pretty well (at a cost).

Most of the horror stories we know about are of recent vintage. Typically they are stories of large DP organizations investing vast amounts of resources and providing next to nothing in the way of deliverables. Our reputation as an information industry has deteriorated. What with faster machines and better support software, such as operating systems and DBMS, and many computer science programs in the colleges, the results should have been just the opposite.

It is interesting to observe that smaller companies and smaller systems are doing well. There are many success stories among users of the IBM System/34 and /38 and the like. The growth of effective microcomputer use, often by non-DP users, is also a recent success story. The problem seems to be with the



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large DP departments that have become so hierarchically dense that communications breakdowns have all but strangled the organization.

Many organizations with turnover problems have taken into their midst poorly educated, poorly trained analysts that have a little knowledge of methodology but no developed creative skills, no street savvy and no hands-on experience in the shop or sales meetings. And what has been the remedy for this condition? Not to simplify the hierarchy, not to encourage and enable creativity — the answer has been to layer on more standards and methodologies and further formalize communications.

The motivations that brought on this response were understandable. They include:

- Poor documentation and vague standards in a time when turnover among DP professionals has become a real threat to systems development and maintenance.
- Fragmented, redundant, uncataloged, imprecise data because of a lack of corporate data policy. The result is an inability to produce high-level decision support systems.
- Poor response time as batch systems were converted to on-line interactive systems and new on-line applications were developed on ineffective data base systems.
- Mounting application work loads.
- Abdication of the design specifications function by the analyst so that the coders became too involved in the creative process and "did their own thing," at great cost to the operation.
- Poorly trained analysts, who were not interested in the business, trying to tell experienced users how to automate their work places.
- Lack of a corporate strategic plan and a systems development architecture leading to a situation where the hinges that squeaked the loudest got oiled first.

It is time for a set of corrective measures beyond methodology and form. In our search for a more scientific approach to the former black art of systems development, we are losing some very valuable assets. Here are five specific areas of concern:

1. Ignoring the role of chance. Most of us (especially in our profession) ignore the role of chance in our

lives. We may have met our spouses because we decided at the last minute to go to a party — or gotten our job because a change in flight plans on our trip home from college led to our meeting someone helpful on the plane. We think, in our technocratic ignorance, that we control our lives entirely by up-front planning. We don't — rather, we do and we don't.

It may be costly at first, but if we stay fluid during analysis and only turn solid when we are well into de-

sign, we will provide for more creative development of appropriate production systems. In the long run, this will in fact turn out to be less costly. Nothing is more senseless than to ignore the sudden opportunity for substantive improvement because it would mean rewriting 500 pages of systems documentation. The time to deliver solid documentation (and to send copies to the world) is first in the completed design specifications and later in the user opera-

tions manual (but keeping the key users involved at all stages).

What is wanted during systems analysis is a thorough but fluid study with plenty of room at the margins for change (and employees that don't leave during the development of their project!). This is not the time to resist good ideas for change from the users. However, they should understand the increased costs that might be involved.

2. Too many cooks spoiling the

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soup. With Plato's dialectic at work, the user (or user team) and the analyst (or analyst team) are intensely engaged in the dynamics of problem solving. Out of this close communication will come the synthesis of the problem into the best solution. Management should oversee the process and see that the solution is properly bounded, appropriate and interfaces well with other projects. This has always been the good way.

However, in all too many Fortune

500 companies and other large system sites, the dialogue between user and analyst has been replaced by energy-draining hassles with many players getting into the energy path between the principals and effectively killing off the creative potential. Every player has an organization, a base of influence and a fragmented view of the whole.

This eclectic pile is unmanageable. These players should be moved out of the central arena but retain their

functionality. This would seem to indicate that the systems development manager's role must include acting as a buffer between these forces and his creative people. This will increase the stress on the manager, but is necessary if the work at hand is to get done.

3. Using obsolete tools and methodologies. The perfect example of this is the decision support system (DSS). Of course, some fortunate readers are already using state-of-

the-art (since 1968), fourth-generation application development systems to maintain data bases, catalog data descriptions, enter data and retrieve reports. But there are actually workshops where all this is still being done by DP programmers using Cobol and BAL, without user participation in implementation, and supporting their huge programs with data flow diagrams, structure charts, module definitions, transaction definitions and procedural listings.

It boils down to this: When you reduce the lines of programming from 10,000 to 300, the whole picture of what constitutes appropriate documentation changes to something much more simple.

There are a number of first-rate data management and data base management software systems now available and constantly being improved. Also available but sometimes hard to integrate at this point are customized software packages dealing with specific activity areas such as accounting or personnel.

The ideal solution for the '80s is a data base management and application development system, a corporate data base, integrated application packages and lean, maintainable documentation. It is often the case that verbose, costly-to-maintain documentation deteriorates in quality with time to the point of uselessness. This is not to imply that some operational systems do not require extraordinary documentation to be useful.

4. Fragmentation of systems analysis: the artificial separation of data from process. Processing, as we have already described, is the elemental level of the system. A system has activities, activities have operations and operations are a set of processes using resources. Data is one of these resources. In DSS, the process can be so routine (insert, update, change, delete, retrieve) that it is subject to automation and the data becomes preeminent.

In operational systems, the data, while a vital resource, is usually not as complex as the processing. In either case, it is essential to problem-solving that the activity be considered as a whole, examined as a whole, defined as a whole, reformulated as a whole and remapped as a whole. This includes both processes and resources, such as data.

It is reasonable for a systems analyst to wear two hats, a data hat and a process hat, but to define a data analyst and a process analyst as separate jobs reporting to separate managements who ultimately report to a senior manager is a dangerous step in the wrong direction. Too many cooks make waves in the soup. It is another step toward the destruction of the creative process that is the dynamic between user and analyst.

While wearing a data analyst hat, a systems analyst might move away for a while from applications development to do some basic research on corporate data (definition and usage)

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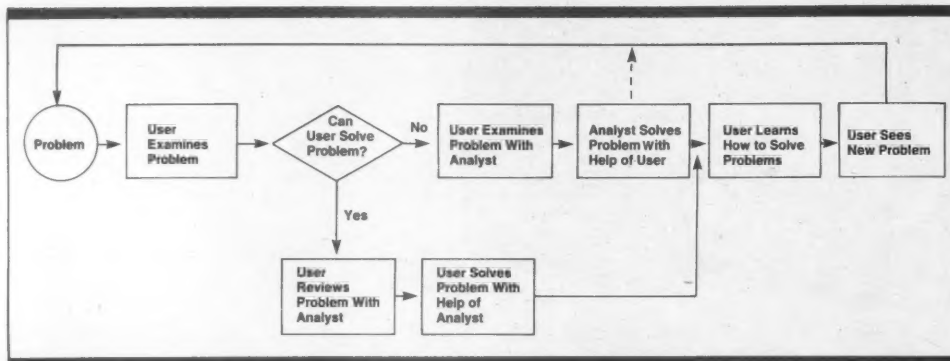


Figure 2. User-Analyst Problem-Solving Machine

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and to define entities of data on the activity level, but it is not practical to define all corporate data as a separate up-front operation to applications development. This is a foolhardy expedition into either confusion or double work. Data must ultimately emerge inductively from process development, although data categories can be defined deductively (but as fluid) from top-down data analysis. It is true, however, that when the significant decision support systems have been set up and to a large extent the corporate data is captured, further systems development will be in the happy situation of having the data resource already available.

5. **Not understanding the historic necessity for devolution.** Devolution means fading out of the foreground of the picture into a supportive background (see Figure 2). There will be a great deal of good works to do after devolution of the DP specialist from the role as scribe

to the user.

While the Gutenberg Press made the scribe obsolete and unchained the unreadable Bible from the pulpit, it did not eliminate the finer functions of information creation. It did not eliminate writers, clergy, lawyers and analysts, and certainly the management of corporate data processing will tend to increase, not decrease, in importance as we decentralize some information handling functions.

We are now engaged in the historic process of enabling users, through good human interfaces, to do their own problem solving and implement their own solutions. The sooner the better! The work to be done in dealing properly with information is next to overwhelming.

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About the Author



Robert E. Leslie is senior systems analyst for Reader's Digest Association, Pleasantville, N.Y., where he has over a 21-year period alternated between project management and systems analysis.

Before working at Reader's Digest, Leslie was a programmer and programmer/analyst for three years at the Columbia Records Division of CBS, Inc. He has also done consulting in systems analysis on a voluntary basis for a number of nonprofit organizations.

He holds a B.A. in English from Columbia University. His professional associations include the Westchester-Fairfield Chapter of the Association for Computing Machinery, where he is responsible for professional development seminars, and the Tappan Zee Chapter of the American Production and Inventory Control Society.

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STRATUS VS. TANDEM

(Or how the hardware fault tolerant solution supersedes the software based solution.)

"If you drive down the cost of physical hardware, you can make typically redundant paths for less money. Not surprisingly, most redundancy breakthroughs that will occur happen in hardware rather than in software."

You can build a double computer inside one box for less dollars, as opposed to doing it in software, which continually needs maintenance and revision, as well as improvement."

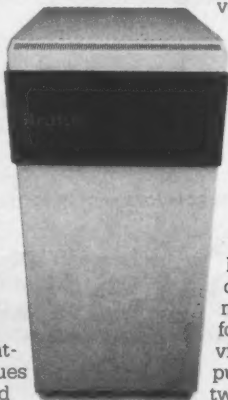
by Aaron Goldberg
of IDC which
appeared in *Computerworld's*
December 28, 1981 issue.

Now that the computer age is in full stride, 100% availability is fast changing from a luxury to a necessity. Downtime and its costs are unacceptable, especially when there is an alternative. Now that fault tolerant operation is becoming a universal requirement, there is demand for an improvement over the software approach used by Tandem. These computers must provide better performance, be easier to use, be easier to program and re-program, be less complicated and less expensive. We believe that the Stratus hardware based fault tolerant system answers these demands. Let us explain.

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The crux of the problem with software based systems is that they require complex, performance stealing software to provide fault tolerant operation. This software robs the system of precious resources because it uses processing cycles to pass status and checkpoint information back and forth between two computers. What's more, this passing of information can occur at four levels: operating system, user program, file management, and terminal control.

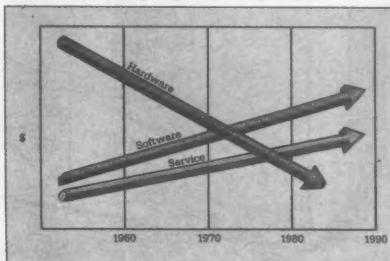
Stratus, meanwhile, has eliminated all this reliability software by having duplicate hardware components tightly coupled, dedicated to performing the same tasks at the same time. It's like having two computers in one, rather than two separate computers. Checking hardware logic detects errors with no performance loss and stops failing components instantly. The duplicate partner continues without interruption, unaffected



STRATUS/32 - SYSTEM HIGHLIGHTS

1. A simple hardware solution to fault tolerance that totally eliminates the need for extra application design and additional programming.
2. A design without performance penalties for fault tolerant operation - NO CHECKPOINTING!
3. A computer that pinpoints and isolates its failures, so repair is made quickly and inexpensively.
4. A system that can expand to 32 Fault Tolerant Processing Modules under a "single system image."

by the failure. This is all transparent to the programmer and the user. With Stratus, there is no performance or data loss when there is a failure, no operator intervention, and no special programming.



While software costs will rise because they are people dependent, experts agree that hardware costs will continue to fall.

Why Stratus is easier to implement.

The Stratus designer and programmer might as well be dealing with a conventional computer; one of them, not two.

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\$130,000 - Software included.

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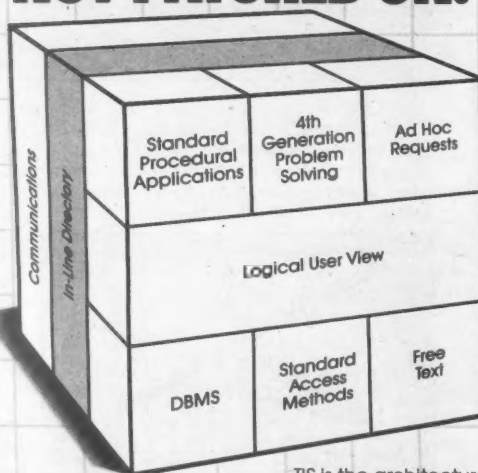
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SPECIAL REPORT

DBMS: Opening Doors To New Opportunities



Edited by Lois Paul and Susan Blakeney

Oct. 25, 1982

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Fueled by Variety of Applications

Total DBMS Revenues Seen at \$1 Billion by '87

By Lois Paul
CW Staff

NEW YORK — The data base management system (DBMS) market will increase in total revenue from about \$137 million today to possibly \$1 billion by 1987, growing at a rate of between 25% to 35% each year, according to a market survey released here by Frost & Sullivan, Inc.

Within this market over the next decade, the research firm forecast that DBMS software from computer manufacturers will experience the largest increases, expanding from a current 45% market share to close to 80% in the mid- to late '80s. Independent DBMS software is expected to increase, but at a decreasing rate.

Entitled *Data Base Management System Software Market in the U.S.*, the study was based on surveys of 75 DBMS vendors and over 3,000 user organizations, including the Fortune 1000. Questionnaires also were sent to selected DP people with a serious interest in the DBMS field. Response rates were 27% for the vendor survey and upward of 10% for the user survey, Frost & Sullivan reported.

Market Growth Projected

The researchers indicated that the projected growth of the DBMS market will be fueled by a variety of applications and uses of this software, especially within manufacturing (which they pegged as the largest forecast growth area), order entry and order processing, inventory, finance and marketing.

"The range of DBMS use is broad and on the increase," they noted. "We predict that both the depth and

Vendor/DBMS	Number of Installations	Anticipated Growth Rate
IBM — IMS	1300	High
IBM — DL/1	700-800	High
Cullinane — IDMS	500	Very High
Software AG — Adabas	350-375	High
Cincom — Total	2700	Low
Intel/MRI — System 2000	280	Medium to High
Applied Data Research — Datacom/DB	150	Medium
Infodata Systems — Inquire	100	Low
Computer Corp. of America — Model 204	50	Low

Source: Frost & Sullivan

Installations and Growth Rates for Leading Vendors

the range will continue to grow, as user acceptance increases in concert with the improved price/performance of the total data base management systems environment."

The users and vendors surveyed disagreed on some points in the questionnaires. For example, vendors cited "ease of use" as being their major product advantage and the lack of awareness on the part of users as being their major marketing problem. However, the users thought today's DBMS packages were generally inefficient, difficult to use and complex, the surveyers reported. Both groups saw problems in the area of DBMS understanding and comprehension on the part of the user organizations.

Vendors and users agreed that the market for DBMS software is in a growth phase, mostly because of price/performance improvements in both the hardware and software and increased accessibility of the data base to the end user. "In fact, we ex-

pect the casual user rather than the experienced technician to eventually become the heaviest user of integrated data base management systems over the next decade," the researchers added.

IBM the Leader

According to the survey results, IBM currently is the leading DBMS vendor by most measurements (See chart). "They are the leader in terms of revenues, leading second-place Cincom [Systems, Inc.] by a comfortable margin," Frost & Sullivan noted. The marketing firm estimates that there are currently about 1,300 IMS and 700 to 800 DL/1 installations, totaling about 2,000 to 2,100 installations of IBM DBMS products.

IBM's current DBMS growth rate was cited as high in comparison to its competition. "Moreover, we estimate that a relatively low percentage of IBM and IBM-compatible hardware systems have been penetrated. Extrapolating the sample results of our

Frost & Sullivan User Survey, considerably less than one-third of the installed IBM and IBM-compatible systems in the United States have a data base management system. Therefore, there is still much room for growth for all of the IBM-oriented offerings and for IBM's own offerings as well," the surveyers continued.

The next two "strongest" vendors, according to Frost & Sullivan, are Cullinane Database Systems, Inc., which has about 500 installations of its IDMS offering; and Software AG, which has installed its Adabas DBMS in between 350 to 375 sites.

Closely following IBM, Cullinane and Software AG are five others. Cincom Systems, Inc. has an installed base of about 2,700 users of its Total DBMS. "Therefore, Cincom ranks first in terms of number of DBMS installations. Although a vital factor in the marketplace, we assess their growth rate to be on the low side," the surveyers continued.

Next in line are Intel Corp., with 280 installations of System 2000; Applied Data Research, Inc., which has its Datacom/DB product installed in about 150 sites; Infodata, Inc., whose Inquire DBMS is in about 100 installations currently; and Computer Corp. of America, which has installed Model 204, its DBMS, in about 50 organizations. The study includes detailed analysis of these vendor's products and marketing strategies.

The *Data Base Management System Software Market in the U.S.* study (No. 747) is available for \$925 from Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Inside

DBMS Guides Growth of Forest Products FirmSR/3

Clarify Objectives Before Implementing DBMSSR/4

What's Missing in Data Base Machines?SR/5

The Day the Good Software Fairy Paid a VisitSR/6

DBMS Delivers Service to 'L.A. Times' ReadersSR/8

Four DBMS Trends Take Industry Into 1990sSR/9

Aircraft Firm Flies Along With DBMS SupportSR/12

Relational DBMS Developed By Non-IBM Mainframers ...SR/18

Relational Models Viable in Commercial WorldSR/19

DBMS Shopping? Consider Conversion CostsSR/22

Conversion Costs Hidden Pitfalls of DBMSSR/26

Prevention Techniques Ease Processing SnagsSR/27

Technique Minimizes Deadlock PossibilitySR/28

DBMS, Graphics Complement Each OtherSR/30

DBMS Results in Quick, Painless Drug ResearchSR/35

T/S Firm Uses DBMS to Track Its ComputersSR/39

Distributor Goes Relational to Modernize FilesSR/40

Specific Capabilities Necessary in Future DD/DSSR/41

School Switching From Batch to On-Line With Aid of DBMS ..SR/42

N.Y.C. Housing Warms Up to Data Base SystemSR/43

DBMS Tunes Up Cable Firm's ProductivitySR/44

Relational DBMS Backs U.S. Combat SystemsSR/45

Real DBMS Benefits Realized in On-Line EnvironmentSR/46

Methodology Key to Applications IntegrationSR/49

Productivity Tools Must Match System NeedsSR/51

Parameters Help Optimize Data Base DesignSR/53

Full-Scale DBMS Needed in Micro WorldSR/56

Health Group Uses DBMS to Cure Data IllsSR/57

Training Critical to Implementation of DBMS ...SR/60

DBMS Guides Growth of Forest Products Firm

Multinational Employs 40,000 In Over 400 Locations

HAMILTON, Ohio — With its annual sales growing to \$4 billion in 1981, a forest products company here turned to a data base management system (DBMS) to help handle its ever-increasing information load.

Champion International Corp.'s domestic divisions include: Timberlands, which manages Champion's massive forestry concerns; Building Products, which manufactures products ranging from softwood plywood to particle board; Paper, with products ranging from fine writing papers to milk and orange juice cartons; and Packaging, with consumer packaging, corrugated containers for household appliances and paper bags for groceries.

The company employs 40,000 people in over 400 locations in the U.S., Canada and Brazil.

Focus Consolidates

Focus — a high-level, user-oriented, English-language DBMS from Information Builders, Inc. — has helped the company consolidate its far-reaching information needs and simplify its data retrieval functions.

It was designed as a fourth-generation software resource to respond to the need for rapid and accurate access to exploding amounts of information.

Operating in an interactive environment, Focus is said to give users on-line access to data through its nonprocedural language and reportedly satisfies a full range of needs — from simple inquiries to complex problem-solving reports, statistical analysis and financial models.

"Many of our users, out in the mills and distribution centers, are not experienced in data processing — and there's no reason why we should expect them to be," said Tom Walsh, technical services director at the

Knightsbridge Data Center.

"They are solution-oriented, not process-oriented, and they look to the MIS [management information systems] group for solutions to their business problems," he said.

"Our responsibility, then, is to respond quickly with solutions that they can use. They, like users everywhere, are growing more and more frustrated with traditional DP organizations. The mystique that used to associate programmers with gurus is gone. We are facing the same problems that are confronting MIS organizations all over.

"First, there are too few people to build the required systems in traditional ways. Second, systems cost too much and take too long to build. Third, there has always been a communications problem between users and technicians," he said.

"All of these factors exacerbate the problem of how to get something done in this business. And that, of course, is the key issue of the 1980s — how can we be more responsive to the end-user community? If we don't solve that problem, we'll be in serious trouble in a very short time.

"Here at Champion," Walsh continued, "we are addressing the issue on three interrelated fronts.

"First, we are making very sure that our planning is as comprehensive as possible. We study trends in hardware and software technology and trends in our own way of doing business and plan our systems development accordingly. One of our corporate systems is still serving us well after 10 years of operation, and we'd like all our systems to enjoy that longevity.

"Second, we are developing 'solution centers' [information centers]. These centers consist of an MIS consultant, with a strong business background rather than a DP background, armed with a set of tools to help people solve their own problems. Such tools include time-sharing under Focus, personal computers and advanced office systems software such as report generators that are end-user friendly," he said.

A Relieved MIS

"The goal is that the consultant would serve as a guide for the user and relieve the MIS department of some of that burden. In this solution center approach, we are going away from building traditional systems and toward solving problems.

"I had been investigating traditional DBMS," Walsh continued, "but realized that I was looking at the wrong tool. We didn't need the recovery capabilities of a DBMS; we needed to deliver information to users in a friendly way. That's when we decided on Focus, because it's solution-oriented, not process-oriented.

"We designed a sales and inventory system, called Macs [Management and Control System], around Focus



Bob Quebman was instrumental in designing the sales and inventory system built around the English-language DBMS, Focus, chosen by Champion. The DBMS "was installed early in September 1981. We attended eight days of classes and had Macs up and running by the third week of October. It was a straightforward implementation for a complex system because Focus itself is very straightforward," Quebman recalled.

and our Comten, Inc. 3690. Each of the distribution centers enters its inventory, order entry and invoicing information into its IBM Series/1 at the close of business each day," Walsh said.

"Overnight, the Comten collects all the information and transfers it to a Focus data base on an IBM 3033," Walsh said.

Daily Basis

"The information is ready for access at the start of each business day by analysts in Stamford, Conn., and the regional offices using Texas Instruments, Inc. 940 terminals and 810 printers," Walsh concluded.

Gary Davidson, administrative assistant in the Building Products Division's Denver office, said, "We think Focus is great — not only because it's so easy to work with, but because we can get much more information than was possible before. And, with Focus, we can get reports out of the data center on a daily, rather than monthly, basis.

"Focus has certainly increased our effectiveness as planners because we have so much more information available," Davidson added. "No one here who uses Focus has ever had any DP experience, so it is truly an end-user-friendly product."

His sentiments were echoed by Fred Jacoby, senior operations planning analyst in the Stamford office of the same division, who uses Focus to keep track of inventory and to calculate the division's profit margin on a daily basis.

"We use canned Focus procedures [written in Hamilton, Colo., and Denver for the most part] about 30% of the time to run regular reports. The rest of our Focus information is through ad hoc queries," Jacoby said.

"The Focus language is simple and straightforward, so I can sit at the display and compose a query almost as quickly as I could state it in En-

glish," Jacoby said.

"And the response is immediate. I've begun working with Focus graphics for plotting trends. That, too, should be enormously helpful," Jacoby said.

Bob Quebman, MIS technical analyst at the Knightsbridge Data Center, was instrumental in designing and writing Macs.

"Focus was installed early in September 1981. We attended eight days of classes and had Macs up and running by the third week of October. It was a straightforward implementation for a complex system because Focus itself is very straightforward," Quebman said.

"Now we're looking at Focus for its data dictionary, forecasting and color graphics. We're already producing histograms on Focus usage. The color graphics will be great additions to this capability," Quebman said.

This enthusiasm is exactly what Walsh predicted and is the prime reason why the first Focus application was a relatively restricted one.

Cautious Steps

"We're moving very cautiously," Walsh said. "One step at a time. The user interest and demand for Focus is very high. People in the remote and regional locations want more. And the Timberlands Division, for example, with its huge data base of information stored by tree and tract of land, can't wait to have Focus made available to them. But we don't want to be overwhelmed with the demand."

"We have to manage our own growth. We realize that we're probably more conservative than most, but the time we have spent building this strong base will pay off because I know that it's going to grow — and grow rapidly. And we're confident that Focus will be there, in both our solution and development centers, when we need it," Walsh concluded.



"Many of our users... are not experienced in data processing — and there's no reason why we should expect them to be," says Tom Walsh. "They, like users everywhere, are growing more and more frustrated with traditional DP organizations."

Avoid Disastrous Consequences

Clarify Objectives Before Implementing DBMS

By Brian Davis
Special to CW

If you are planning to implement a data base management system (DBMS), you must be clear about your objectives.

Do you intend to follow a data base approach to managing your company's data or just use a DBMS package as an access method? It is quite common for a DBMS to be used to solve a particular problem with the intention of having no impact on the company. However, there is a danger that using a DBMS in this way can result in its use increasing in an uncontrolled way, often resulting in disastrous consequences.

A DBMS is just a tool. A data base approach, on the other hand, is concerned with the proper management of the company's data and implies a well-organized data processing department that has good standards and procedures, which are strictly enforced. It is also important to understand the difference between establishing an integrated data base and implementing a number of separate data bases for main units or functions.

The integration of systems needs to be approached with caution because of the much higher level of expertise required, the politics involved in sharing information, the increased overheads involved with processing and maintaining the data base and

the problems associated with maintaining integrity and providing recovery.

Data Base Approach

Following a data base approach can involve a large capital expenditure, and it is essential that senior management not only understand the implications of what is involved, but also that they maintain overall control of the project. Unless management understands what is involved, they will expect major benefits to be provided "at a stroke" and will quickly become disillusioned when they are slow to appear.

It is generally agreed that it is important to establish an authoritative data base administration function at the beginning of a data base project. Most people recognize that the data base administrator should be appointed at management level and that the function will eventually involve several people.

In practice, this has proved to be very difficult to arrange. Many companies have refused to come to terms with the problem and although there is a person called a data base administrator, he is usually a programmer who performs a low-level data control function. In this position the data base administrator has no authority and can exercise no real control.

If a company is serious about imple-

menting a data base system, the data base administrator must be the absolute authority on the definition and use of data. There can be problems, however, even where the data base administrator function has been properly set up. Given an urgent situation, managers are likely to pull rank and bypass the established procedures in order to overcome serious problems. It is not possible to guarantee that this will never happen, and if it does occur the data base administrator must follow up after the event to ensure that his records remain consistent.

Data Dictionary Important

The most important aid required by the data base administrator is the data dictionary. A data dictionary is a worthwhile tool in any DP department, but it becomes a necessity when a data base system is being implemented.

Experience has shown that where a company did not have a data dictionary at the start of a data base project, it was soon forced to establish one. It can be both difficult and time-consuming to create a data dictionary for data in existing systems. Unless you have exceptionally well-documented systems, it is probably only practical to develop a data dictionary for new applications.

It is quite common for companies to experience major problems in coming to terms with their existing data. Ideally, the whole project should be organized to be dependent on the data dictionary and designers and programmers should have on-line interrogation facilities. Update authority should only be available to the data base administrator.

The wider implications of data base systems make it difficult to agree on a requirements base line with users and this can cause major delays to the project. If systems are to be implemented across departmental boundaries there are likely to be serious political problems related to the sharing of data, which can only be resolved by senior executives. These types of problems occur far less in organizations where the initiative for the data base approach comes from the "top."

In all computer developments there is rarely a fixed end product at which to aim. The system inevitably changes as it is being developed. The problem with a data base system is that management will expect that the use of a DBMS will enable you to take on board change more readily.

Secret of Success

Although the use of a DBMS does make change easier, the secret of success is the development process in which management control, structured techniques, data analysis and the data dictionary all play a vital part in producing a system that is both flexible and easy to maintain.

However, data base reorganization and restructuring can involve very lengthy processes, which may cause severe operational problems if you

are implementing a large data base.

To carry out a detailed data analysis exercise is expensive, requires trained personnel and must have strong management backing. However, it is an essential process if data is to be controlled and managed effectively.

This is not, however, an area where you can afford to let an enthusiast loose without very strict controls. Given a careful approach and the application of a lot of common sense, benefits can be achieved.

Bringing in experience either from the vendor or a consultant can be a good investment, but be careful how you use these people. You should aim to produce a system that can be maintained easily by the type of staff you expect to have around in the future. Make sure that the experience of the people brought in is passed on to your staff by embedding them in the project teams.

Careful control is required over the way in which programmers use the DBMS data manipulation language. In some organizations they have formed a special group to write it. A better system has proved to be the one that allows the programmer to write the data manipulation language with a special group to review what they produce.

Although there is some truth in the statement that trainee programmers have fewer problems in using a DBMS than do programmers experienced in conventional file management techniques, there are in practice few problems in getting people to think data base at this level. The problem is more likely to occur among the designers.

Success Factors

Experience has shown that the organizations which have had the most success in implementing a data base system have the following things in common:

- A long history of successful data processing.
- The existence of good standards and procedures, which are strictly enforced.
- Previous experience in implementing integrated systems.
- A corporate commitment to using the DBMS for all systems.

There is no doubt, however, that providing you gather together the necessary expertise and have total management commitment that the path of least risk is in the development of a totally new system.

Finally, it is worth making the point that most of the disasters that have been attributed to the DBMS are in reality the result of bad management. Usually the package has been introduced as a panacea in the hope that it will cure problems that have resulted from a badly organized DP department or from the activities of a group of technical specialists that have been allowed to get out of hand.

Davis, a consultant in the UK who specializes in data base systems, has written several books on DBMS user experiences.

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What's Missing in Data Base Machines?

By Ronald G. Ross

Special to CW†

What face does a data base machine show the "outside" world? The answer is no face at all — at least until somebody outside supplies it with one.

This is one of the unexpected features that two significant offerings in this area, the Britton-Lee, Inc. Intelligent Database Machine (IDM) 500 and Intel Corp.'s Intel Data Base Processor (IDBP) share. In both cases, the "missing" component is the access language syntax — that essential piece of specification that gives a system its hands-on appearance to the using public.

Why missing? Everybody's definition of a data base machine includes the idea that such a processor represents a specialization of function — specifically, the data base management (DBMS) function. This specialization, of course, becomes visible only when compared to something else — an opportunity that arises nowhere more clearly than in a network of distributed, but communicating machines.

Specifically, some nodes in a network may be geared toward application processing, whereas one or more others (i.e., data base machines) are geared toward data management. Requests for data are passed from application processing machines to data base management machines, and the results passed back.

Because the data base machine is segregated both physically and functionally from application processing, it can exert no control whatsoever over what goes on within that processing, or over how the language used to affect the processing is formulated. It can go no farther than simply to dictate what format the messages it receives must take. It is, in fact, simply a faceless engine for the data management function.

Consider Centerville

As an analogy, consider mythical Centerville, a small mid-America town with a labor problem. Specifically, for its six very popular breakfast houses, there is only one very overworked short-order cook.

Naturally, each breakfast house has its own menu, each boasting its own unique array of combination plates. The harried cook is very good at scrambling eggs, frying bacon, etc., but naturally finds it impossible to keep track of the dissimilar and ever-changing menus.

The solution: The cook insists on a basic set of commands for service — eggs-over-easy, hashed browns, etc. No menu-level commands are permissible. Before each menu-based customer order is submitted to the cook, the breakfast house is first obliged to translate it into the standard, service-level language.

Note that the cook's language is not, however, necessarily procedural or "atomic" in nature just because it is featureless. For example, an order for three fried eggs doesn't tell the cook where the eggs are stored, or how to serve them back.

Some, in fact, would argue that the

service language — even if featureless — must be more powerful than traditional one-cook-per-restaurant counterparts. This is because the shared cook is physically separate and functionally distinct from each served restaurant, and also because the shared cook must be able to satisfy many different menus. And so it is when a specialized data base processor is introduced into a network.

As the central "kitchen" for "cooking up" data, it must insist on a direct service language for specifying what is needed. All the dressing on this language — the item on the menu — must be left to the application processing

language, the "restaurants" where data is "served". This is where "personalities" — the faces of data base machines — are actually created.

Extra Bang

The justification for a specialized data base machine (as opposed to a generalized machine selected to run a now distributed DBMS) is that it offers significantly enhanced data management capability and performance, relative to cost. Both Britton-Lee and Intel are betting on the relational model to provide this extra bang for the buck.

Whereas the jury is still out on that

one — even though a good case seems to have been made — there is one very large irony in their offerings.

That irony resides in the fact that taken in isolation, their data base machines are faceless. They are missing that very ingredient so fundamental to relational theory — the one that gives the relational model so much of its personality — the access syntax, or so-called data sublanguage.

Ross is the editor of the "Data Base Newsletter," a publication for data management professionals published by Database Research Group of Newton Lower Falls, Mass.

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The Day the Good Software Fairy Paid a Visit,

By Ralph J. Mintel
Special to CW

R. Hero knew exactly what he had to do and how to do it, but he didn't know how to explain where it came from.

What happened was that R. Hero, a software hand at Show Down, had been implementing a relational data base management system (DBMS) and data base on Show Down's new computer — but no one had recognized or appreciated it. The reason was that R. Hero had been converting the relational DBMS package, called Join, that an associate had developed on Show Down's old computer. All along R. Hero had been issuing plans, flowcharts and briefings about how Join could be the heart of Show Down's new information system.

But Show Down's old computer was old. Fifteen years old. Wordy Mouth, hired to procure Show Down's new computer, took every opportunity to remind people how old the old computer really was. He said that anyone who did anything in the style of the old computer system was out of step with the times.

Wordy also had a lot to say about DBMS. So glorious were his pronouncements that one could have easily mistaken him for a computer salesman. Wordy had been hired by R. Hero's manager, Boss — that should give you a good idea of who had Boss' ear.

Swayed by Wordy, Boss tried all kinds of subtle and not-so-subtle tactics to get R. Hero in step with the data base times. But R. Hero had looked at the package Wordy had procured. It was DBMS-Two from Donkey Systems, Inc. R. Hero considered it to be truly a donkey, for it had some disadvantages (to put it mildly): complexity, large system overhead, an unreadable reference manual, a scarcity of users and no host language interface to Show Down's standard language.

R. Hero knew that if he went down the DBMS-Two trail, disaster would result. Even if he had tried and failed, Wordy probably would have convinced Boss that R. Hero just didn't have the expertise to understand and successfully use modern technology. So R. Hero used Join and kept converting programs, all with calls to Join. Eventually, the new Join-ed data base was a couple of weeks away from being operational.

It was about then that Boss was overwhelmingly convinced by Wordy that something was wrong with R. Hero's conversion work and something had to be done about it. Boss called in one of his consultant buddies, Chilly Winters, to review R. Hero's work and progress.

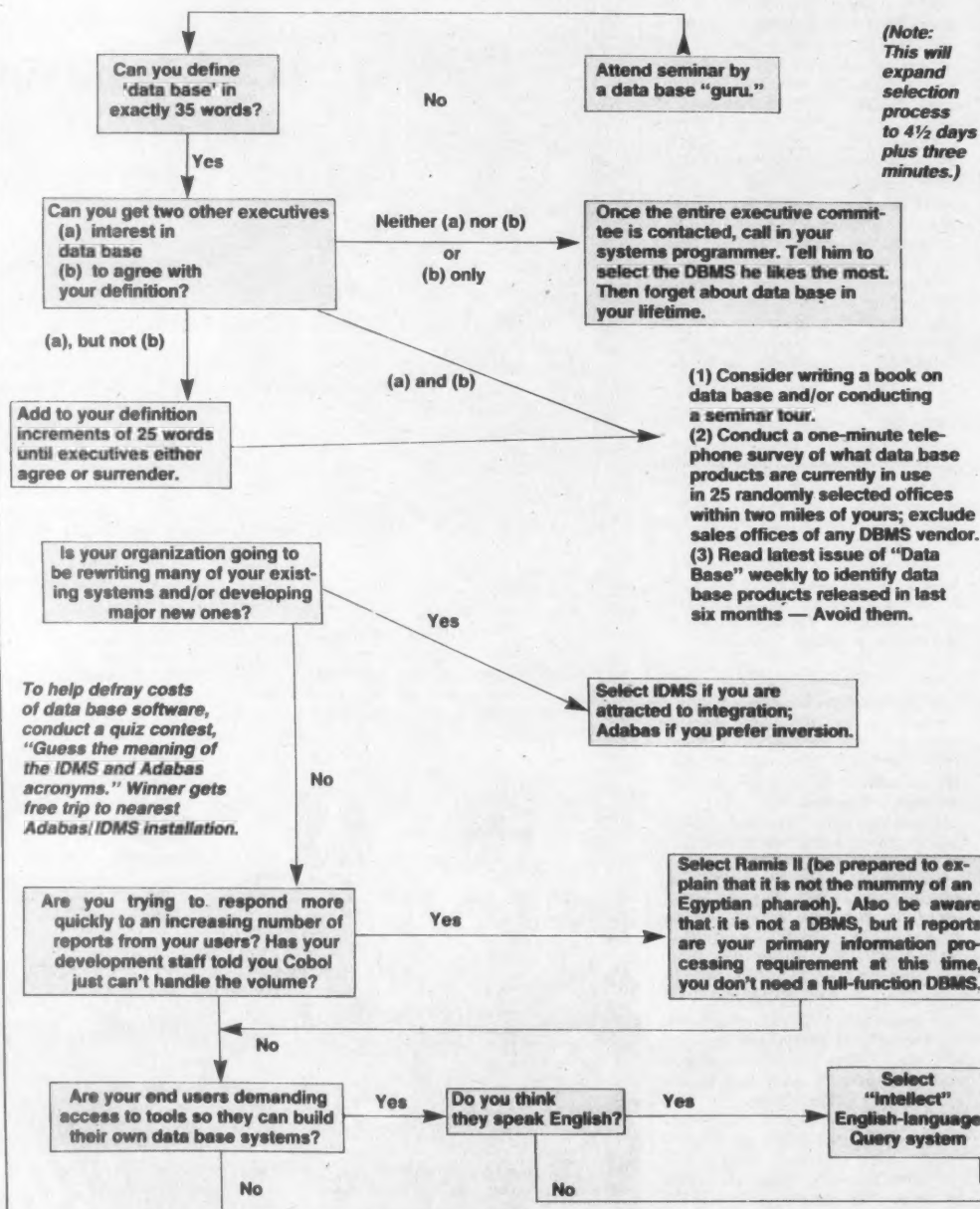
After a few head-on collisions with Chilly, R. Hero decided that he had to give in, because the odds were against him — Chilly, Wordy and Boss against one. But R. Hero didn't want to let the past year's conversion work and the simplicity, elegance and utility of Join go down the drain. He slept on the problem.

Inspiration paid an overnight visit. R. Hero realized that Join had to

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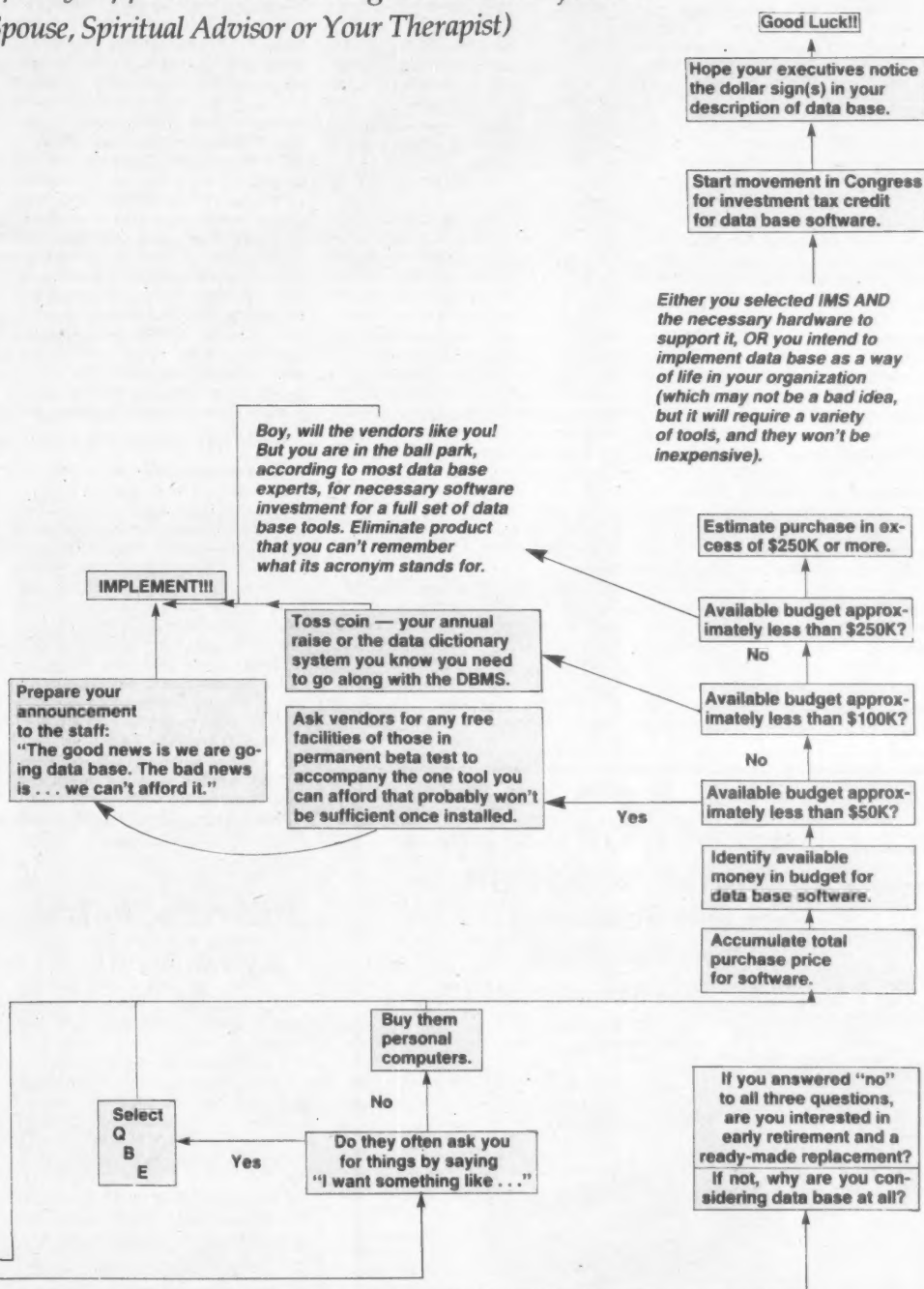


Or How Show Down Co.'s DBMS Was Selected

Base Software Selection Quiz

Test by Paul Hessinger†

Speedy Approach To Selecting Data Base Software
(Spouse, Spiritual Advisor or Your Therapist)



have a new name, a new label and a new image. Thus, DBMS-Three was born. R. Hero changed the name of the object program from Join to DBMS-Three. Quietly and swiftly he called up the documentation for Join on the text editor and replaced all mention of Join with DBMS-Three.

A bold plan, too good to be true. R. Hero was stumped on one thing, though — how to explain where DBMS-Three came from, in case anyone, especially Wordy, should ask. Since Wordy was in charge of hardware and software package procurement, he would know that DBMS packages don't fly in the window overnight as gifts from The Good Software Fairy.

Or do they? At this point, R. Hero just didn't care about the possible consequences, so he worked up a tout sheet that would have put even Wordy to shame. He heralded DBMS-Three as being a new relational DBMS package that answered all of the problems of DBMS-Two. He liberally applied terms such as simplicity, elegance, powerful flexibility, unlimited relationships, ease of use, programming liberation and proven performance.

The unexpected turn came while the announcement was being typed. Doris Donkey, the Donkey Systems representative-in-residence at Show Down, had just sent around a notice that there would be a new release of DBMS-Two installed soon. Doris was so serious about her work that she didn't know — or perhaps didn't want to know — the score about DBMS-Two and Show Down. Nobody was using DBMS-Two except the person who wrote the tape library system with it, and that was small potatoes compared to Show Down's real computer work.

What an opportunity for R. Hero. He figured that nobody would really understand Donkey's new release of DBMS-Two and, if he acted quickly, people might think that Three was really a new Two. He piggy-backed DBMS-Three onto Donkey's new release of Two by sending out his announcement of Three the very next day.

There was some confusion, to be sure. Wordy, too stunned by the event, was surprisingly quiet for once. But a few questions had to be answered. Like one from Chilly, asking for the source listings of DBMS-Three. R. Hero said that Donkey Systems wouldn't even let him see the source, so he couldn't be of any help on that one.

Doris had a few things to say, too. She suggested that maybe R. Hero had made a typo or two on the numerical suffix of DBMS. R. Hero quietly admitted to that. There were a couple of other technical questions, but R. Hero felt certain that Doris was not steeped in the traditions of data base concepts and terminology (she only knew the Donkey Systems buzz words), so he tossed out some relational data base jargon. Doris wrote it all off to his ignorance of DBMS-Two in particular and to his overzealousness about data base sys-

(Continued on SR/8)

†Hessinger is director of advanced technology research with Computer Task Group, Inc., a national consulting firm headquartered in Buffalo, N.Y. He said this somewhat fictional account of what many MIS managers face as they attempt to select the proper data base software is "actually a composite of my own consulting and seminar experiences."

DBMS Delivers Service to 'L.A. Times' Readers

LOS ANGELES — Customer service, circulation management and the billing of over a million subscribers of the second largest newspaper in the U.S. is being handled here by a data base management system (DBMS).

The Los Angeles Times is home-delivered and distributed throughout Southern California by over 200 independent agents and their 1500 carriers. All bills and collections are processed through the mail at The Times central office. All customer start/stop/change of service requests and other service inquiries are centrally handled and dispatched, under computer control, to delivery agents in the field.

The Times' computer system includes two 6M-byte IBM 3032s and an IBM 370/158 system operating under OS/VS(1) with 24 IBM 3350 disk storage devices. Some 200 Zen-tec Corp. 3270-compatible terminals link users throughout the paper with the circulation system. Cullinane Database Systems, Inc.'s IDMS — along with the firm's Integrated Data Dictionary, Culprit report generator and on-line query packages — are used to tie the on-line system together.

"The business decision to bill directly from the home office was made back in 1975," Richmond Lovelace, circulation systems manager, said. "From the beginning it was clear that a sophisticated on-line computer system would be needed to achieve the objectives of that decision. In our case, that meant a data base management-oriented system," Lovelace observed.

DBMS 'The Only Way'

"When the only link you have with a subscriber is a telephone call, you have to be sure a record of that call is in the system and that you can rely on its accuracy and currency," he

continued. "In this business, if a paper isn't delivered or service isn't started immediately, the person simply won't call back. In a system this large, data base management is the only way you can do it."

In the course of an extensive system design effort, Lovelace and his staff carried out a formal evaluation of every DBMS on the market. All were evaluated using a weighted-average method. Systems with inverted file structures, high maintenance requirements and complicated architectures were quickly eliminated for their particular applications. Ultimately, "the network architecture, ease of physical design, high-volume transaction-processing capability, integrated data dictionary, easy-to-use reporting system and superior backup and recovery facilities" of Cullinane's IDMS tipped the scales in its favor, according to The Times.

The present computer hardware configuration was installed in 1979. By October 1980, all applications software had been written in-house, the production data base had been loaded and thousands of hours of operator training on the system had been completed. Today, 345 operators staff the system seven days a week, from 6:30 a.m. to 6:00 p.m., maintaining a data base of some 27 million billing, service history and financial activity records.

Management specified that an objective of the new system would be to get a paper to any person in the home delivery service area — from Santa Barbara to Mexico and from the Pacific Ocean to Riverside — within one hour. To do this from a central point required an elaborate communications network to complement the computer system.

At The Times' customer service center, 273 telephone trunk lines are staffed by customer service represen-

tatives equipped with headsets, computer-assisted telephone-answering devices and a CRT terminal connected to the circulation system. Once the computerized answering system takes a call, it identifies the city of origin to the operator, makes the connection and the circulation system computer takes over.

The operator's immediate task is to find and recall the appropriate subscriber record from the computer's data base. To facilitate the operator's job, the system provides seven different paths to the needed information: account number, "match code" (an 8-digit code of the subscriber's name and address), address, name within Zip Code, name within Southern California and a new account number not tied to the subscriber's address (which can and does change often).

While the operator talks to the caller, the computer continually displays prompts and questions to be asked of the caller. The operator keys in the answers and the computer retrieves and displays required information in any of 300 screen maps provided by the system. Operators can perform 85 transactions from the terminal.

After the operator has retrieved the correct subscriber record and entered all complaint information, he enters the data into the computer. The computer maintains a mapping of the Southern California service area by block range — 35,000 streets and 150,000 street segments — and can immediately associate a given location with the appropriate carrier. The computer simultaneously logs the entered data as a "complaint record" to the subscriber and as part of the carrier's "agent complaint set." All delivery agents call in regularly to collect their complaints and immediately respond to them.

If the subscriber is calling with an

account inquiry, the operator can use the same seven paths to obtain needed financial data. The system displays up to six months of detailed account information at the terminal, showing financial activity by date, dollar amount and adjustment type.

The entire process, from initial connection to the time the next call is ready to be received — including record search time, talk time, processing and postprocessing — has been designed to take no more than 84 seconds per call. In fact, each call is now processed in an average of 54 seconds, making it possible for the center to process up to 5,000 calls per hour — with actual volumes ranging from 10,000 to 12,000 start-stop service orders weekly and a total of 225,000 customer service calls a month.

The Times bills 60,000 subscribers 20 days a month and processes 30,000 payments every business day. The billing operator is batch-driven from hand-coded transactions, while payment documents are immediately scanned at The Times and put on magnetic tape for input to the computer. Lovelace and his staff are in the process of putting the entire billing applications on-line to permit direct posting of all financial transactions.

Significant Number of Benefits

With computerized billing and the new distribution systems, The Times has reaped a number of significant business benefits. "First on the list," Lovelace said, "is improved cash flow. The paper now has money coming in every day, whereas, before, dealers were only required to pay once a month."

Lovelace and The Times' financial analysts estimate the annual savings of the computerized circulation and home delivery system to be \$3.5 million — roughly the total hardware/software cost of the system. Most of this will take the form of direct labor savings that will accrue from replacing 150 staff members, who currently maintain subscriber record books manually, with the new on-line system.

Software Fairy Pays a Visit

(Continued from SR/7)

tems in general and let the matter drop.

Boss loved it, though. He viewed the announcement as a breakthrough in R. Hero's attitude. With warm congratulations and mountains of praise, Boss told R. Hero that he was right in doing things the modern data base way.

R. Hero didn't have the heart to tell Boss where DBMS-Three really came from. Instead, he asked for a promotion — and got it!

To this day, R. Hero has kept his secret. But every anniversary eve of the event, he makes an offering of milk and cookies to The Good Software Fairy.

Mintel is a computer programmer in Seattle.

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Four DBMS Trends to Take Industry Into '90s

By Tom Melchiorre
Special to CW†

Data base management systems (DBMS) have undergone characteristic changes in the past year — changes that will have far-reaching effects throughout the decade for the software industry and its end users. Brought about through increased user/vendor interaction, four DBMS trends will take the software industry into the 1990s (see chart).

The most apparent of these trends is the relational DBMS or the incorporation of relational techniques into established DBMS. The latter is the latest strategy of well-established DBMS vendors whose current user base is satisfied with system performance and throughput for the most part, but would like the system to be more user-friendly for nontechnical personnel. Software that is user-friendly, an overused phrase that is becoming a cliché, has a concrete manifestation in relational systems. The word "relational" will displace the phrase "user-friendly" and become the key word when speaking of systems development.

Vendors Listening Well

Most DBMS vendors have listened well to this growing need for increased ease of use. Applied Data Research, Inc.'s (ADR) Datacom/DB had been steadily acquiring relation-

Relational:

Accent R	National Information Systems, Inc.
Datacom/DB	Applied Data Research, Inc.
DPL	National Information Systems, Inc.
SQL/DS	IBM
TIS	Cincom Systems, Inc.

Relational-like:

DRS	Advanced Data Management, Inc.
Focus	Information Builders, Inc.
Inquire-	
IO/Net	Infodata Systems, Inc.
Model 204	Computer Corp. of America
Ramis II	Mathematica Products Group
Seed	International Data Base Systems, Inc.
System 1022	Software House

Firmware:

Systems 2000
TIS

Integrated:

Adabas	Systems and application software
ADR/Datacom	
System	Systems and software
Focus	Systems and applications software
IDMS	Systems and applications software
Inquire-	
IO/Net	Systems and applications software
Model 204	Systems and applications software
Ramis II	Systems software
System 1022	Systems software
TIS	Systems software
Total	Systems software

Distributed Data Bases:

Adabas
ADR/Datacom System
IDMS
Inquire-IO/Net
Model 204
System 2000
TIS
Total

Source: Datapro Research Corp.

Mainframe DBMS Trends Breakdown

al methods over the past four years until recently, when the vendor converted the system to complete relational functions.

Other DBMS have incorporated relational functions but have not gone totally relational. Advanced Data Management System's DRS, first in-

stalled in 1970, now incorporates relational data base organizational methods. Model 204 from Computer Corp. of America and System 1022 from Software House, Inc. both now have relational data base organizational methods as well. Infodata Systems, Inc.'s IQ/net is "relational-

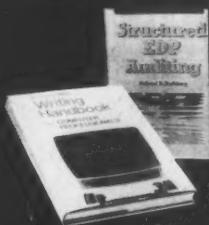
like," and International Data Base Systems, Inc.'s Seed offers a relational-like interface.

Two other systems — Ramis II from Mathematica, Inc. and Focus from Information Builders, Inc. — feature relational capabilities. These sys-

(Continued on SR/10)

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CW-10/25

DBMS Seen Going Relational Into the 1990s

(Continued from SR19)

tems, however, are not considered by some to be true DBMS. Still, each has a strong user base that is predominantly satisfied. Oddly enough, the big three DBMS — IBM's IMS/VS, Cullinane Database Systems, Inc.'s IDMS and Cincom Systems, Inc.'s Total — do not specify any relational capabilities.

DBMS that are truly relational have yet to proliferate. Two minicomputer relational DBMS — Relational Software, Inc.'s Oracle and Relational Technology, Inc.'s Ingres — have been on the market since 1979 and 1976, respectively, and have gained ground in the minicomputer field. On the mainframe front with ADR's transformed Datacom/DB, National Information Systems, Inc.'s (NIS) DPL has been relational since its inception in 1975. DPL, however, is an application development system built upon a relational DBMS and can be considered similar to Focus and Ramis II in its user orientation. In 1980, however, NIS began installing Accent R, a relational DBMS de-

signed as a DBMS and initially coded relational. Cincom's TIS, announced this year although first installed in 1979, is also an original relational DBMS, as is IBM's Structured Query Language/Data System.

All of these systems also contain data base and/or query languages with varying degrees of end-user friendliness, their vendors said.

A Second Trend

A second trend in today's DBMS market is the totally integrated software system. Toward the end of 1980 vendors earnestly began integrating various types of software to form entire component systems of totally compatible products. This began as a response to user needs for applications and system software that operated with maximum efficiency under a DBMS.

TIS, Datacom/DB and IDMS typify the three approaches to integrated systems. TIS, designed as an integrated system from the beginning, offers separately priced components for monitoring communications, on-line

query, data retrieval, task-level recovery, applications development and its relational data base.

Along similar lines is the ADR/Datacom System, a set of 10 component products. Eight of these components were acquired in 1978, and ADR has introduced two new products into the group this year. Since its acquisition, ADR has developed new inter-product software to integrate the separate components into a fully relational integrated system.

The ADR/Datacom System includes a data dictionary, data base designer, DB/DC high-level language, relational query system, file retrieval and reporting system, DC control system, editing facility, distributed data processing (DDP) and applications development system. Again, all components are separately priced (another trend that accompanies the integrated component approach). As is the case with most component systems, discounts are available when purchasing several products at the same time.

Cullinane offers a structure, similar to ADR, with its IDMS and is also integrating applications software from other vendors. Other DBMS vendors have been active as well. Computer Corp. of America, Intel Corp., Infodata and Software AG of North America, Inc. each offer integrated systems, although to a lesser extent. At the same time, Software AG has integrated Management Science America, Inc.'s (MSA) financial application packages, as well as SAS Institute's SAS statistical analysis and graphics package, into its Adabas system for maximum efficiency. The Model 204 also offers an interface to SAS.

The third and fourth trends that will take DBMS into the 1990s will be as equally beneficial as the first two, but are only now beginning to get off the ground. The third trend is DDP and the capability to access data bases in different geographic locations. The ADR/Datacom System appears to have the lead in this area, although Total/TIS, Model 204, Intel's

System 2000, IDMS and Adabas are contenders in this area as well. The lead, however, is up for grabs since the trend to distribute data bases is just getting off the ground.

The final DBMS trend that will take the industry and users into the 1990s is firmware — software functions on a chip. As users demand increased software performance, the idea of putting the most often used DBMS functions into a hardware component will become more common.

Faster Processing

By putting these often-used functions on a chip, memory that would normally be used for storing code is now freed and can be put to better use. In addition, firmware results in considerably faster processing. Currently Cincom's TIS is the only DBMS employing this concept as part of the system, while the System 2000 offers it to a lesser degree with optional upgrades.

How will these trends affect the marketplace? The integrated approach will allow the purchaser to buy a product with the guarantee, more or less, of total compatibility with other essential products that the purchaser may want to add. This will prove less frustrating to the purchaser than the software market of a few years ago and, in the long run, will increase user loyalty to the vendor.

The relational approach that the integrated components are employing will also help companies who are hiring more nontechnical personnel to operate these systems. The whole idea behind the relational techniques is to relieve people of the burden of understanding how the computer works, that is, making the system transparent to the user.

At the same time, incorporating firmware into a user's system will allow the system to maintain more data in its main memory instead of on disk or tape, thus increasing throughput dramatically.

Melchiorre is assistant editor/software for Datapro Research Corp. in Delran, N.J.

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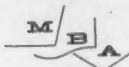
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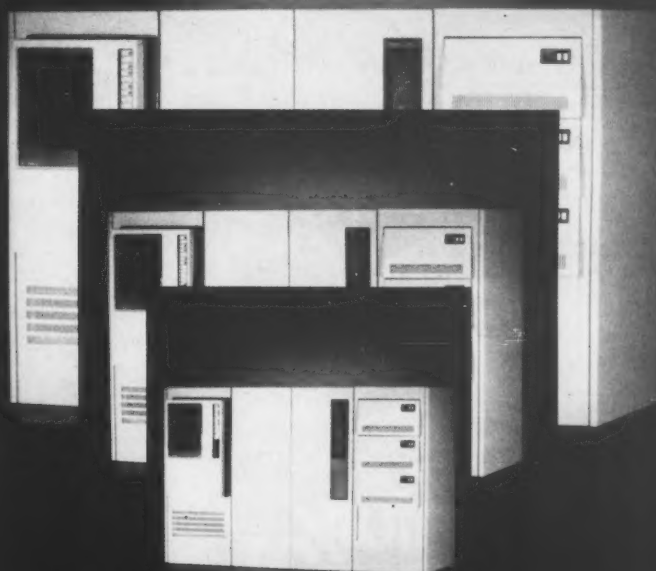
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Tracks Millions of Parts

Aircraft Firm Flies Along With DBMS Support

SEATTLE — Building one commercial jet, which has millions of parts and takes several years to design and over three years to manufacture, requires large amounts of data. Multiply that by several dozen, and you are describing an application that

requires a data base management system (DBMS).

Boeing Commercial Airplane Co.'s (BCAC) simultaneous building of several dozen custom airplanes requires the support of massive computer resources. An important part of that support

system is Inquire, the DBMS from Infodata Systems, Inc. of Falls Church, Va.

Inquire is used by over 20 departments in BCAC to manage such things as financial information for cost-estimating, capital assets management, correspondence

information for the customer services department, detailed descriptions of world airports, navigational data, landing fees and airline equipment requirements for the BCAC sales and marketing department.

The DBMS is offered to in-

ternal users through Boeing Computer Service Co.'s (BCS) own enhanced version of the IBM CMS operating system. There are over 3,000 accounts or user ID's on Boeing's Conversational Terminal Services (CTS) system in Seattle with sometimes as many as 300 users logged on at one time. CTS runs on an IBM 3081 with 16M bytes of mainframe storage and an 8M-byte IBM 4341.

User-Friendly Package

Phyllis Melvin, the Inquire product sponsor within the BCS CTS Support Group, is responsible for coordinating the installation of new Inquire product releases, interfacing with the vendor and coordinating efforts with Boeing's Vienna, Va.-based commercial CTS support organization.

"In CTS, Execs are used much as Macros are used in Inquire, to stack commands and to prompt for user parameters. BCS has developed a package of Inquire Execs which are so easy that even a user with little DP experience can work with Inquire," she said.

"Between these rewritten Execs and a copy of the BCS Inquire Access Guide, users can easily load and update their own data bases," she explained. "Numerous other Execs are also provided to aid in such activities as data base backup and restoration. Many of our users have taught themselves to use Inquire. I think one of the system's greatest values for us is this combination of ease of use and system power."

A.V. Viswanathan, supervisor of the 747/767 computer-aided design (CAD) Data Base Applications Group, explained that nine staff data base experts assist end users with the full range of activities surrounding data base implementation. "We will undertake a feasibility study, a return of investment analysis and a detailed analysis of user requirements in order to choose the best of the several DBMS available within Boeing for that application."

After DBMS Selection

"Once a DBMS has been selected, we will design and implement the application system, do all system testing and thoroughly train users before handing the system over to them for maintenance. But even then, users are encouraged to come to us with problems and new systems enhancement re-

(Continued on SR/16)

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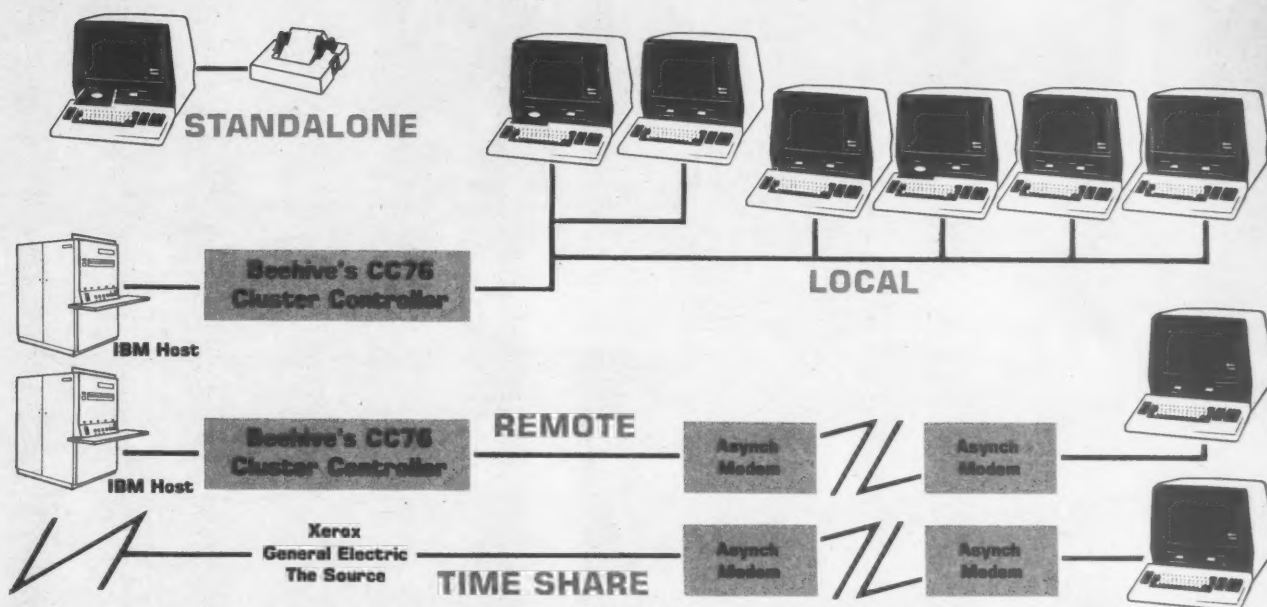
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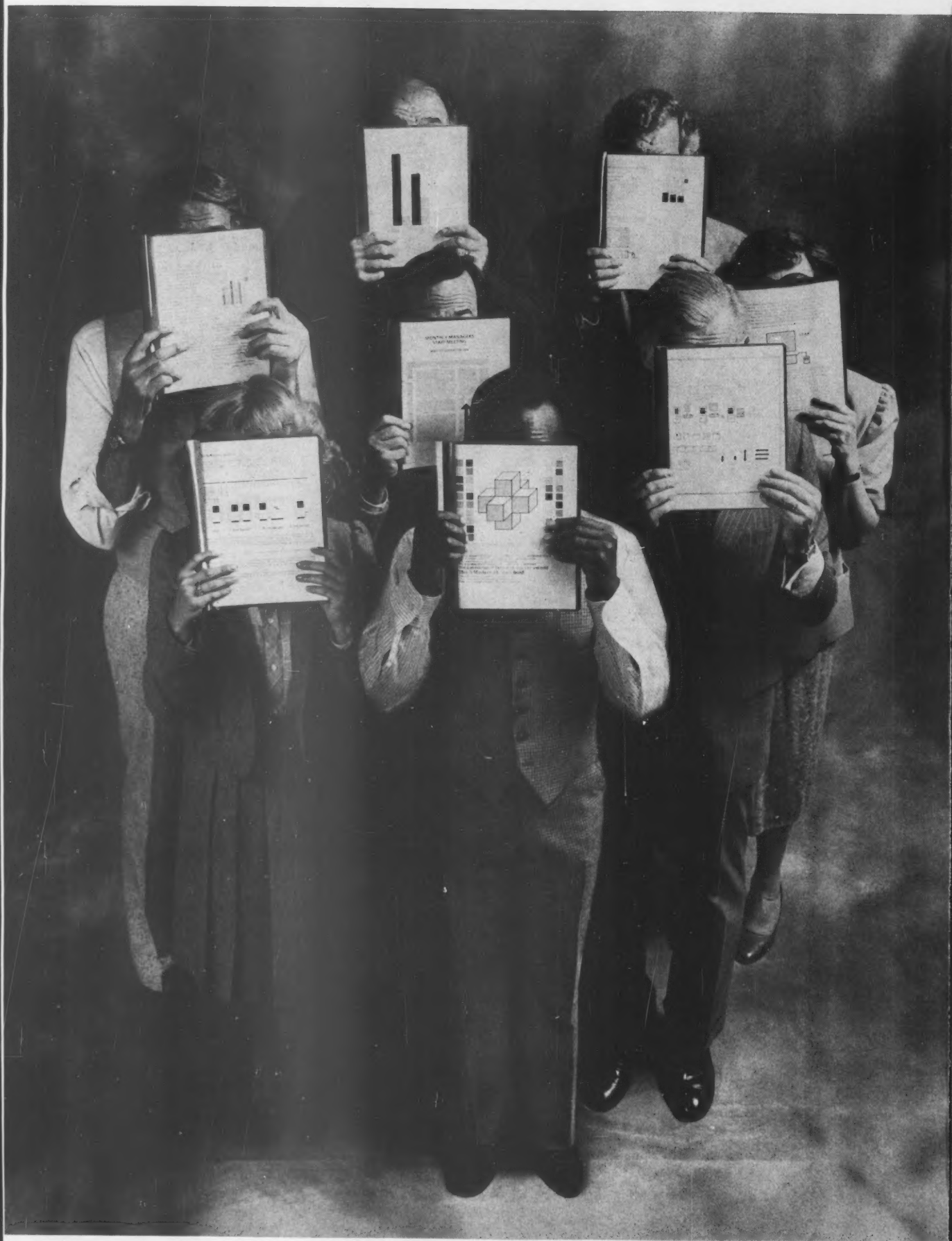
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Aircraft Firm Tracks Data With DBMS Support

(Continued from SR/12)
quests," he said.

Of the many Inquire applications created by the 747/767 CAD Data Base Applications Group, two are particularly good examples of the data base's versatility. An Inquire-based Rejection Tag data base is an integral part of the 747/767 Engineering

Liaison logging system to track and control engineering-related problems identified on parts.

The users of this system have elected to retain the full-time support of the CAD Data Base Group. The users of an Inquire-based Flight Management System (FMS) Interface Control data base

write their own system code to ensure the proper design interfaces of on-board flight instruments and computers.

During the construction of Boeing 747 and 767 jet airplanes, Inquire helps Engineering Liaison to track the resolution of engineering-charged rejection tags assigned by the quality-control

department. Engineering Liaison personnel work with other engineering groups involved with an engineering-charged rejection tag, recording the tag under Inquire, expediting it through corrective action and then storing all information for future reference.

Systems programmer, Don

Aho, of the CAD Data Base Applications Group, selected Inquire to support this Engineering Liaison function. Inquire, replacing a manual logging system that took several days to gather requested information, has eliminated information delays and costs.

Though information stored about each rejection tag is used by several of the 747/767 departments, the Inquire data base is maintained by Engineering Liaison clerks following simple prompts.

New Approach to Avionics

With the construction of the first 767s, Boeing takes a new approach to avionics and the automated control of aircraft by on-board instruments and computers. Through an FMS Avionics data base, Inquire is helping Boeing ensure the integrity of signals that interface between on-board computers, also known as Line Replaceable Units (LRUs).

Manufactured by a variety of electronics firms, each LRU talks to other LRUs in a network via a complex series of signals. Boeing needed a system to verify that signals sent and received by each LRU are compatible. Through the Inquire data base, which contains descriptions of the interface signal characteristics, signals are matched and each field-checked to make certain all system LRUs are sending and receiving properly.

Although this FMS Avionics data base is used essentially to support the design of the 757/767 avionics system, the Inquire system also supports the actual production phases in order to test equipment performance. The Avionics Data Base is maintained by FMS Interface Control Group.

Systems programmer Gene Jochem, of the CAD Data Base Group, selected Inquire for the Avionics Data Base application only after loading a pilot system onto Inquire and two other DBMS. Today Jochem has turned over complete data base system support responsibilities to FMS Interface Control Group.

A third major Inquire application at Boeing is the 757 System & Component Functional Test data bases. Initially created to serve as an index to the documents describing tests performed on close to 2,000 components, these data bases were soon adopted by the company's other departments to identify the track information relating to airplane components as well.

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Other Relational DBMS

A number of relational systems have been implemented in universities for research and in large corporations as internal tools or for some special project. General Motors' Relational General Information System (Regis) and Computer Corp. of America's SDD-1 are worth mentioning here.

Regis is used throughout General Motors Corp. as a decision support system. In 1972, a prototype system called Relational Data Management System (RDMS) was implemented at General Motors Research, Warren, Mich. Regis is derived from RDMS and is opera-

tional for business purposes. Regis is used extensively for decision-making purposes; it provides data base query and data manipulation capabilities along with data analysis and graphics facilities.

Computer Corp. of America's SDD-1 was developed as a result of a grant from the U.S. military, which needed a data base system for military command and control. A relational distributed system, SDD-1 is not intended for commercial release. The system solves the distributed data base problem for military command and control target applications.

Relational DBMS Developed By Non-IBM Mainframers

By Dipankar Basu

Special to CW

Perkin-Elmer Corp.'s Reliance Plus consists of a number of systems that support data base management, transaction processing, data dictionary and query/report writings facilities. The DBMS runs under PE's OS/32 operating system and supports Cobol 74 and Fortran 77 for its callable procedural language interface.

Honeywell, Inc.'s Multics Relational Data Store (MRDS) is operational on the DPS 8 and DPS 8M series computers under the Multics operating

system. MRDS works as a subsystem of Multics and utilizes the DPS 8/8M virtual memory and file management subsystem. Along with MRDS, Honeywell offers its Logical Inquiry and Update System (Linus).

Linus provides a data base access facility for nontechnical users to access MRDS data base. Linus utilizes a high-level, nonprocedural data sublanguage called Linus language. It has such features as a macro facility, line editor, report writer and help facility, along with data security.

Breakdown of Encompass

Tandem's distributed relational DBMS, Encompass, is a collection of facilities. These are:

- **Data Definition Language (DDL).** Along with the data dictionary, DDL is used for designing the data base.
- **Transaction Monitoring Facility (TMF).** TMF provides the capability of keeping the data base in consistent state during concurrent transaction processing or during a program or system failure.

- **A transaction processing system called Pathway,** used to write on-line transaction processing applications.

- **Enform.** A query/report writer facility, Enform is available for both technical and nontechnical users. It also provides interfaces to languages such as Cobol and Fortran.

Encompass runs on Tandem's Non-stop system under the Guardian operating system. The Enscribe data base manager is a part of Guardian. Encompass needs improvement in the following areas:

- **Data Sublanguage Compiler.** Except IBM's Sequential Query Language/Data Systems, most of the existing relational systems utilize data sublanguage interpreter. The compiler is needed for better performance and less system overhead.

Relational Technology is planning to develop a data sublanguage compiler. Probably most of the commercial systems will provide data sublanguage compilers in the future.

- **Performance.** The performance for large data bases has yet to be resolved. Most of the commercial systems are trying to optimize performance to meet the end-user needs.

- **Integrity Control.** Most relational systems provide some form of integrity control, but some do not provide any. Integrity control needs to be improved in all relational products.

- **Added End-User Facilities.** Because relational systems are targeted for enhanced productivity and extensive end-user facilities, additional end-user services are needed, such as query-by-forms, natural language facilities, forms editor, application program generator and graphics.

- **Data Dictionary.** Most of the current relational systems provide a dictionary for the data base. Ideally, a data dictionary should be a single repository of data for the enterprise.

Today's dictionaries offered by different structured data bases (including relational and Codasyl) can be referred to by a catalog that gives information for data in the data base.

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- On-line computational capabilities

BASIS runs on the DEC VAX 11/750 and 11/780 as well as most computer mainframes including IBM, DEC 10, DEC 20, UNIVAC, and CDC. A conversion to PRIME is in progress.

BASIS currently supports a wide range of bibliographic, full text, and numeric data bases for library, litigation, scientific, manufacturing, publishing and many other applications including:

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Relational Models Viable in Commercial World

By Dipankar Basu

Special to CW†

Relational systems have finally become a viable solution in the commercial world. Although a number of prototype systems were built over the last decade, only a few implementations existed in commercial data processing organizations. Furthermore, until recently there was little effort organized to push for their acceptance.

However, during the last two years a number of relational systems have entered the marketplace, and every day the number of entries increases. A system can be called relational if:

- Data is presented in tabular form (follows some kind of optimal data structure like third normal form or entity relationship model).
- All information is addressed as values in tables, not by its position.
- The system provides a user-transparent navigation mechanism and also determines the storage/retrieval access path.
- Operation on data is performed at the set level (mathematical sense) on records and results in the creation of a new relation.

• A data sublanguage facility performs the relational processing capabilities (for example, Select, Join, Project) without superimposing the structure.

Some of the newly introduced systems merely support flat file structure.

Best Known Systems

This article examines the best known relational systems available in the commercial world.

IBM's program product, Structured Query Language/Data System (SQL/DS), was announced in 1981 and is available today for commercial use.

SQL/DS runs on the IBM 370 family computers under the DOS/VSE operating system. It was implemented at IBM's Thomas J. Watson Laboratory in Yorktown Heights, N.Y. It is a by-product of IBM's widely publicized experimental prototype, "System R," and supports SQL, the data sublanguage based on both relational algebra and relational calculus. SQL compiler is a part of the SQL/DS system.

SQL/DS runs on DOS/VSE with CICS. A report writer and data dictionary for data base only is part of the system. The system provides extensive logical view, authorization and security mechanisms. SQL/DS can coexist with IBM's DL/I DOS/VS data base management system, sharing data via an extraction module.

In 1976, IBM developed the Query-By-Example (QBE) system, which supports a data sublanguage also called Query-By-Example. The system was released in 1978 as an installed user program for System/370 Virtual Machines.

QBE enables the end user to access data in tabular form. It provides data manipulation for retrieval, insertion, modification and deletion of table definitions, user-stored data and stored queries. The data is defined, displayed and logically viewed in a tabular format. These tables may be

'Every relational system provides different capabilities and performance criteria. Even though they differ in capabilities, they all share the same major architectural structure to enhance productivity through easy program development, data independence and reduced program maintenance.'

loaded by a QBE utility program or created interactively by the end user. Also, data may be extracted from the IMS data base for inclusion in QBE data by a vendor-supplied utility.

Relational Technology, Inc.'s Ingres is a multiuser relational DBMS implemented initially on top of Bell

Laboratories' Unix operating system for Digital Equipment Corp.'s PDP-11/40, 11/45 and 11/70 computers. The system was developed at the University of California, Berkeley, in 1974. The Ingres prototype for research purposes is located in Berkeley, while a commercial version is avail-

able today. Also, a number of other vendors are planning to commercialize Ingres.

Relational Technology has been marketing and supporting a commercial version of Ingres since January 1981 for DEC's VAX-11 computers running under the VMS operating system. The firm enhanced Ingres by providing missing performance and missing functions.

New Functions

The new functions available are a report writer; Ingres callable from languages such as C, Pascal, Fortran, (Continued on SR/20)

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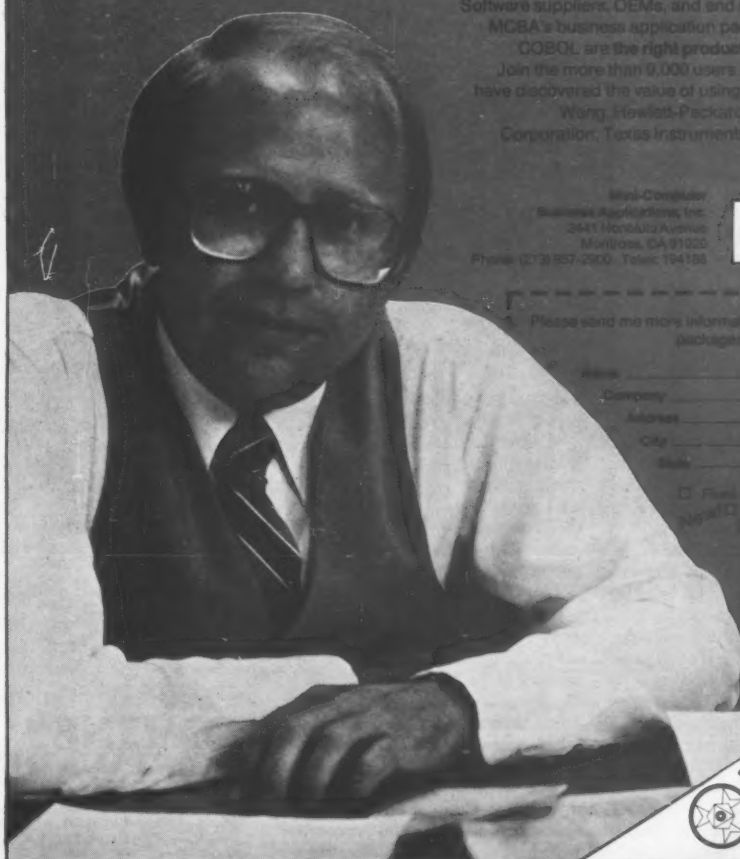
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Selected Relational Software Packages Detailed

(Continued from SR/19)

Cobol and Basic; query-by-forms; and application-by-forms.

The other extensions for the future include:

- Compilation of a procedure (instead of interpretation mode).
- Support of binary trees.
- Merge/sort.
- Forms editor.
- Graph-by-forms.
- Report-by-forms.

Ingres is primarily programmed in C, a high-level language in which Unix itself is written. It supports Quel, a high-level data sublanguage based on the relational calculus. The

user interface, in addition to the data base facilities of Quel, is implemented in a language called Embedded Quel (Equel). Equel consists of Quel embedded in C.

Features include optimizer, user views, concurrency control, simple integrity control and recovery from both soft and hard crashes. Utilities included in Ingres provide the capabilities for loading and unloading the data base and assisting in crash recovery. Concurrent users are protected from interference by locking and transaction recovery features.

Ingres has influenced commercial product lines more than any other

relational system. Vendors, including Relational Technology and Lexidata Corp., are commercializing the product. In addition to that, Britton-Lee, Inc.'s IDM 500 and IDM 200 data base back-end processors are influenced by Ingres software.

Oracle, a multiuser relational DBMS, was developed and is marketed by Relational Software, Inc. of Menlo Park, Calif., which was formed in 1977 to develop a commercially viable relational DBMS.

Oracle is implemented on DEC's PDP-11/23 through 11/70 processors under RSX-11M, IAS and Unix; and on the VAX-11 series under VMS and

Unix. The system is also available on IBM equipment under various operating systems.

Written in C, Oracle uses IBM's SQL as the data sublanguage in the interpretive mode as opposed to IBM's compiler mode approach. Features include a report writer, interactive application development aid and data dictionary for data base.

Relate/3000 was introduced in 1980 by Computer Resources, Inc. of Mountain View, Calif. Running on Hewlett-Packard Co.'s 3000 series of computers under its MPE operating system, Relate/3000 provides very straightforward syntax. Features include a graphics package that provides bar charts, histograms, pie charts, scatter diagrams, and so on.

Breaches Relational Concepts

Limited to 10 indices per file, it also limits the record size. Even though indices do not need any reorganization, data does. This breaches the concept of the relational systems. In addition, Relate/3000 does not provide any comprehensive data dictionary facility.

National CSS, Inc.'s Nomad was released in 1975. The implementation is a major first step for commercial offerings of the relational systems via time-sharing service.

Nomad runs with the DEC PDP-11 and VAX-11 and IBM 370 families of computer environments under National CSS' VP/CSS time-sharing system. It provides the high-level data sublanguage also titled Nomad. Features include a report writer, crash recovery and authorization mechanism. Data items in Nomad can also be grouped into a hierarchical structure even though this structure is not physically linked.

Magnum was developed in 1975 by Tymshare, Inc. of Cupertino, Calif. Along with National CSS' Nomad, Magnum is a major initiative for implementing relational systems via time-sharing services.

Magnum can be described as using a data base structure that is relational-like in nature. Tymshare does not intend to market Magnum to end users.

Relational Information Systems, Inc., also of Cupertino, Calif., released a new system called Accent R, which runs on Decsystem-10 and Decsystem-20 and uses a high-level language to develop applications and an active data dictionary. The callable procedural language interface includes Cobol and Fortran.

Basu is a senior product evaluation analyst at NCR Corp. and is associated with the Department of Decision Sciences at Miami University, Oxford, Ohio.

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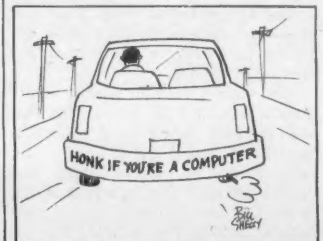
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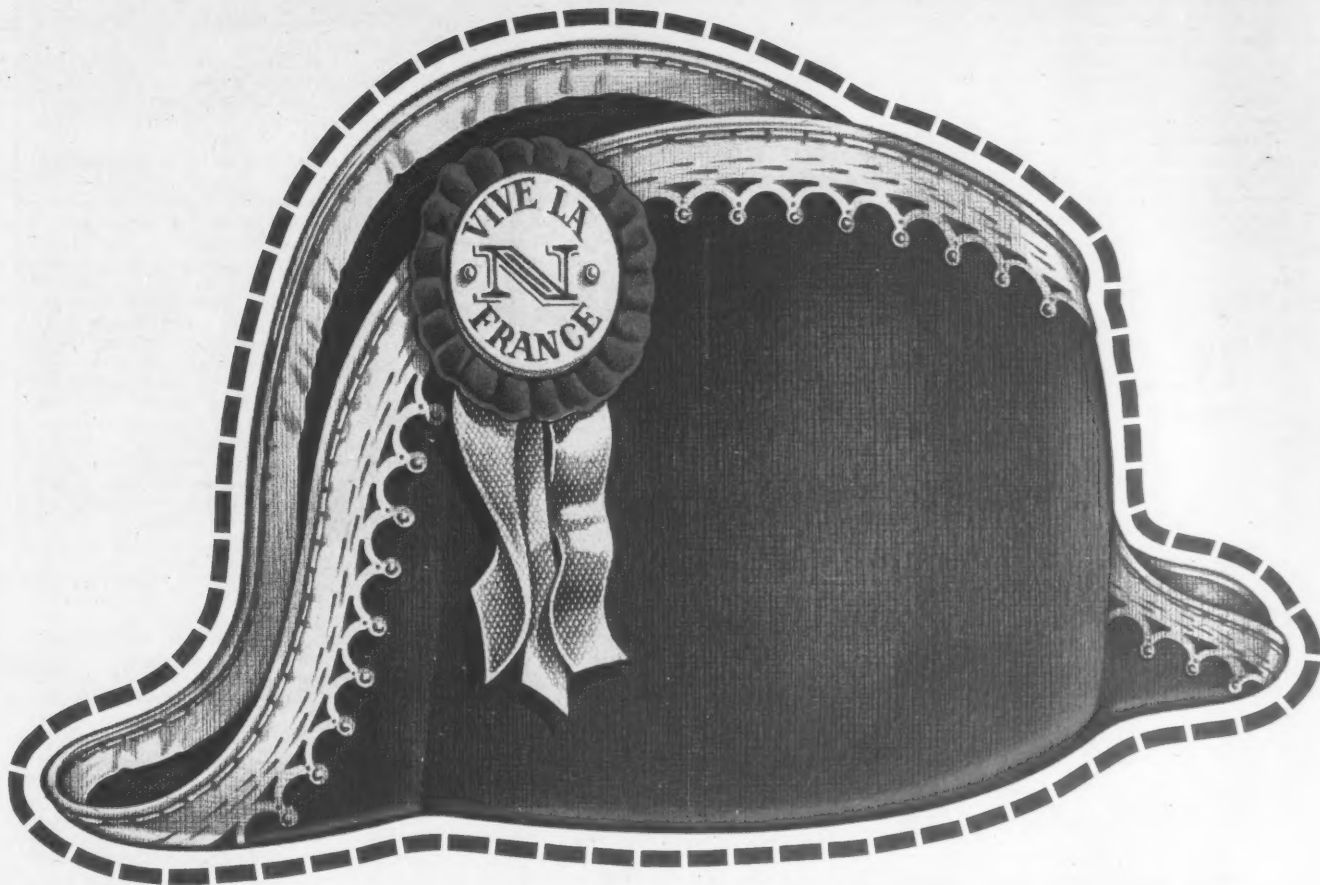


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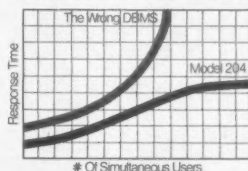
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DBMS Shopping? Consider Conversion Costs

By Robert S. Saltzman

Special to CW†

An important consideration when selecting a data base management system (DBMS) is the complexity and time required to convert the existing files and application programs to the DBMS-based system.

The cost of conversion is a hidden one. A long and complex conversion can be expensive in terms of the resources required, and it can delay the development of

new systems. Therefore, the ability to convert quickly is important.

Another desirable DBMS characteristic is flexibility to permit the development of new application systems without forcing subsequent data base and program conversions. Although logical data independence, through the use of local views of the data base, can insulate existing applications from new systems that require minor modifications to the data

base, new applications that require major changes to the global data base structure can affect existing programs.

A DBMS that allows dynamic restructuring of the data base for new systems without affecting existing programs can further insulate existing systems from data base changes. This data base restructuring capability can help to reduce future program maintenance as new systems are added.

Major Conversion Steps

The major system conversion steps are:

- Design the new target data base including file structure, record layouts, field definitions and so on.
- Convert and load the existing data files into the new data base structure.
- Modify the existing application programs to use the new data base.

A relational DBMS can help reduce time and complexity in completing these conversion tasks and can provide a smooth growth path for new application systems. Most of the advantages of a relational DBMS are attributable to the simple underlying flat file structure. Applications programmers and end users find this structure easy to comprehend.

The flat file structure, in conjunction with the dynamic relational operators, "join" and "project," can provide a relatively direct path for file conversion and a flexible environment for adding future application systems.

DBMS Categories

In general, data base management systems (DBMS) fall into three categories:

- Hierarchical, which allows a member record type to have only one owner record type.
- Network, in which a member record type can have more than one owner record type. A hierarchical data base is a subset of a network data base.
- Relational, in which data is logically organized into flat, table-like files.

Hierarchical and network DBMS use embedded, directed pointers to connect member records to owner records and to create chains between the records. Relational DBMS use data item values to tie logically related records together.

Each DBMS type has a data manipulation language (DML) that gives the user data access and update capabilities. Hierarchical and network DMLs provide a mechanism to access records directly using the data items specified as "keys," which uniquely identify record occurrences. The user can "navigate" through the data base structure by following the embedded, directed pointers from record to record.

Relational operators allow the relational DBMS user to "select" records using data items defined as "keys" in their local view of the data base and to combine or split data records to form new data records.

In many cases, the data base design step can be accomplished by examining the current files to remove redundant items, flattening the files by moving recurring data items to separate files and by confirming that all "key" data fields necessary for accessing and relating files are present. An effective procedure for accomplishing these data base design objectives is the "normalization" process.

The end products of normalization are functionally independent flat files that

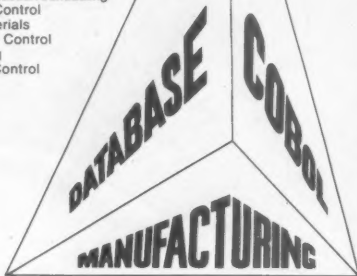
can help maximize system flexibility. Due to the dynamic capability of a relational DBMS to restructure logically the data base at any time, the initially converted data base need not be fully normalized (third normal form) before the subsequent conversion tasks are completed. In general, files that contain limited data item redundancy and are in flat, table-like form may require little initial redesign in order to proceed to the data base loading step. Full normalization

(Continued on SR/26)

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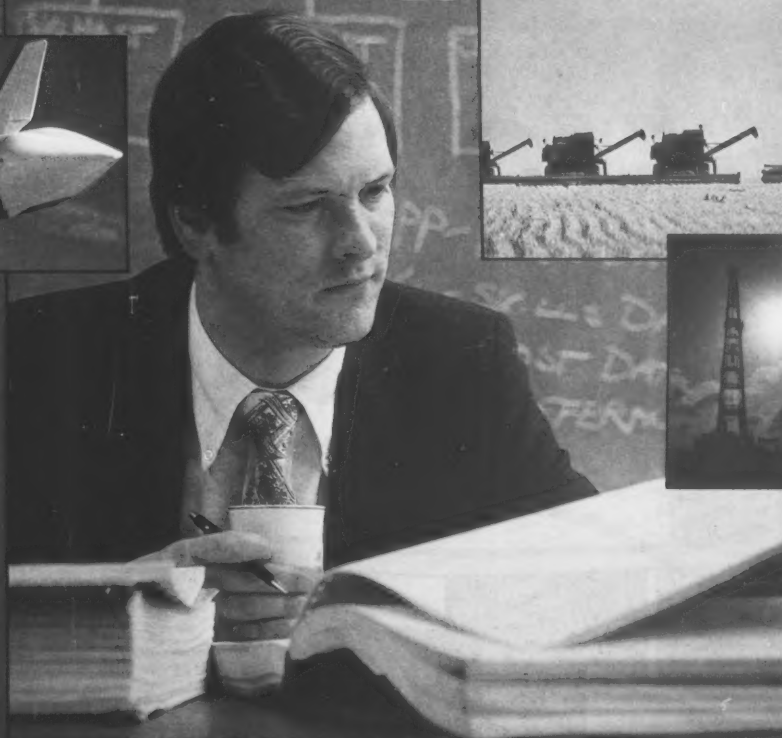
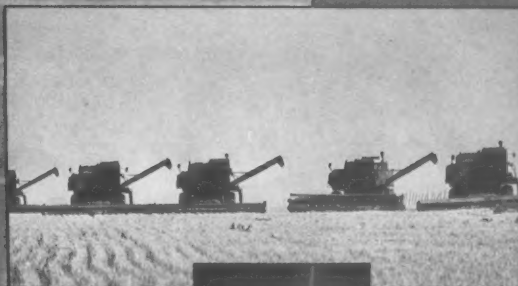
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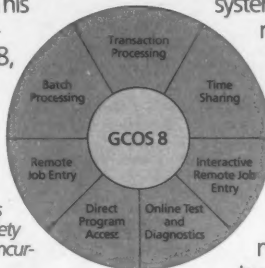
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Conversion Costs Hidden Pitfall of DBMS

(Continued from SR/22)
tion, which is recommended, can be delayed until after the conversion is complete.

Physically loading the existing files into the flat files of the relational data base can be fairly straightforward. In many cases, the loading can be a one-to-one file move. If the target DBMS

provides file conversion aids and utilities, this step can be further simplified and accelerated.

The application program conversion, assuming programming language compatibility, can also be straightforward. If file, record and data item names are retained from the old system,

the only procedural code requiring modification should be the syntax of the I/O commands to conform to the new DBMS.

Impact of New Files

If new or modified files were developed in the data base design step, the impact of the new files on the con-

verted application programs can be reduced by using the "join" and "project" relational operators to combine and split apart the files to retain compatibility with the old system.

The same relational operators can also help to minimize the impact of new application systems on existing

programs. If new combinations or subsets of existing files are needed by new programs, the relational operators can be used to generate dynamically these files without affecting the already existing programs. Since the global data base is composed solely of independent, flat, table-like files, new files can be added without affecting existing files or programs that do not use these files.

The relative ease and speed of converting to a relational DBMS can be compared with the potentially longer and more complex conversion to a network DBMS. Due to the directed pointers that are embedded in the data base records to make connections between owner and member record types, network data bases can be relatively static in terms of restructuring capability.

Given this environment, the full global data base structure (schema) for supporting the converted systems and new future systems should be completely analyzed and defined in the design step.

Some Guesswork Required

This necessity to design the data base fully can consume a lot of time and resources since a network data base is a complex structure to understand completely, design and implement. Since all future systems cannot be completely defined at the data base design stage of a conversion, some guesswork is required to attempt to develop a flexible data base design that will meet future needs.

The designer must attempt to build in enough flexibility to reduce the potential for additional data base and program conversions due to changes in the global data base structure to support new systems. This is not always possible. Similarly, the data conversion and load and program conversion steps can be complex, time-consuming and technically demanding.

It should be noted that if a new file has to be added to the network data base, some of the linked files might require redefinition and reloading due to the changes to the embedded, directed pointers. A new file added to the relational data base could probably be loaded directly into that file. Only programs that will use the new file should require modification.

Saltzman is a senior management consultant at Coopers & Lybrand's New England Management Consulting Services Division in Boston.

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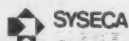
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Prevention Techniques Ease Concurrent Processing Snags

This article has been excerpted with permission from "Concurrency in DBMS," which appears in Auerbach Publishers, Inc.'s Data Base Management of Information Management series. Young is a systems engineer with NCR Corp. in San Diego, Calif.

By John W. Young Jr.
Special to CW

Concurrent processes operating on shared resources present a serious problem in a data base environment and threaten both process and data base integrity.

The solution is a locking mechanism that minimizes the possibility of deadlock.

When two or more processes are operating on the same data in a potentially conflicting way, that data must be "locked" so that only a single process can operate on it at a time. A shared lock allows other concurrent processes to read it, but prevents any concurrent process from updating the element. An exclusive lock prevents any other process from either reading or writing it.

A major decision affecting the performance of a data base system that uses locking is the size, or granularity, of the data grouping to be locked. If a transaction is to access a large number of records of the same type (or all of them), it may be more efficient to place a single lock on that record type rather than myriad locks on all the record instances.

To provide a more flexible, efficient solution to the granularity problem, a technique has been developed known as intention locking. With this method, the data types and instances are arranged in a hierarchy. The user can place a "warning" at any node in the hierarchy to signal that a descendant of that node is locked. This allows different transactions to manipulate different subtrees of the hierarchy without interference or excessive locking overhead, provided their uses are mutually consistent.

Special Solutions

Several problems on the issue of concurrency require special solutions.

The slow-reader problem occurs when one process reads sequentially through an entire section of the data base, while other processes wait to update that same section. If the section were left unlocked, the slow reader would not see a consistent view; if it were locked, however, the updating transactions might have to wait a long time. One solution is to lock that part of the data base long enough to make a fast copy of it which the slow reader could use at his leisure.

A faster but more complex alternative is to preserve a time-stamped copy of the old version of each record whenever it is modified during the time the slow reader is executing.

A Consistent View

The following rules were designed to ensure that a data base will present a consistent view:

1. A process should get a shared lock on a data element before reading it.
2. A process should obtain an exclusive lock on a data element before writing it.
3. A shared lock on a data element will not be granted if anyone holds an exclusive lock on that element.
4. An exclusive lock on a data

element will not be granted if anyone holds any lock on that element.

5. A process should hold all its exclusive locks until it has completed its operations successfully and has finally written all the modified data back into the data base.

When the slow reader gets to the point of the modification, it can use the time stamp to determine the version that existed at the time it began execution. This allows any number of slow readers to operate on the same data simultaneously and independently.

Temporary inconsistency occurs when a set of integrity constraints has been specified for the data base, and if multistep transactions are being run against it, one or more of the integrity constraints may be temporarily violated between steps of the transaction. For example, a constraint may require that the total of the account balances be \$1 million. This constraint will not be satisfied after a transaction has subtracted \$1,000 from one account and before that figure is added to the intended account. Thus, a need exists for commands that suspend and resume the checking of integrity constraints.

In some systems locking is implicit, controlled by whatever access command is issued to the data base management system (DBMS). In this mode, however, the DBMS has no way of knowing the user's intentions or requirements. As a result, the consistency control has to be on a "least common denominator" basis. In those systems that provide explicit locking, the user can "fine tune" concurrency control by locking only the required elements and by retaining the locks for as short a time as possible.

A predicate lock consists of a description of specification of the set of elements that should be locked on behalf of a particular operation. Instead of having to manage thousands or millions of locks, the DBMS has only a (relatively) few predicate locks to administer.

A system may take either of two approaches when a process tries to access a locked record in a prohibited mode. A status may be returned to the process and indicate that it has attempted to violate a lock restriction. The process may then continue its execution and try the operation later. The process may be suspended and entered into a queue to await record availability, when it is reactivated. In some systems, the requestor

(Continued on SR/28)

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Technique Minimizes Deadlock Possibility

(Continued from SR/27)
may specify which of these methods is desired.

Deadlock can occur only when all of the following five conditions exist:

- **Concurrency** — Two or more processes simultaneously compete for exclusive use of two or more sets of data.
- **Locking** — A process can be given exclusive use of data.
- **Additional locking** — A process can request additional locks while holding locks to other sets of data.
- **No preemption** — A set of data cannot be forcibly taken (preempted)

from a process that has locked that data.

• **Circular wait** — A circular chain of processes exists such that each process locks a set of data that is being requested by the next process in the chain.

The problem of deadlock can be averted by avoiding any one of these conditions.

Four Methodologies

There are four basic methodologies proposed for handling deadlock.

The first is to ignore it. When a deadlock occurs, it is detected by some external means. At that time,

one of the deadlocked processes could be terminated.

Of course, if any updates had been completed by the terminated process, they would have to be backed out in order to preserve data base consistency. There would also be delays. Ignoring deadlocks is counterproductive.

The second technique is detecting deadlock and backing out. This requires a mechanism that can detect when a deadlock has occurred. It entails using a "state graph" that indicates the status of the data base relative to the interactions of the active processes and data at a particular

time. The state graph is updated whenever a process becomes active or terminates and whenever a granule of data is allocated or released. This graph is examined for a chain of locks, implying a deadlock (circular wait), whenever a process has to wait (or periodically, during longer intervals).

Once the deadlock has been detected, the more complex problem of backout must be addressed. In general, this will be the backout process whose cost is least.

The third technique is to avoid deadlock. The DBMS must examine the data requirements of the process in question and determine if the request is safe. An unsafe process is placed in a wait queue. When an active process releases its set of data, all processes on the wait queue are reexamined for safety.

Thus, in addition to the overhead costs associated with maintaining state graphs, avoidance can cause a process to become permanently blocked. This drawback could be overcome by attaching a counter to each process, which would indicate the number of times the process had been examined for safety.

When the counter reaches some threshold, no new process would be allowed to lock data that the blocked process requires. Eventually, the active process causing the delay would terminate, and the blocked process could continue.

Preventing Deadlock

The last technique is preventing deadlock. Reviewing the conditions for deadlock reveals that the locking condition cannot be overcome without sacrificing data base consistency. The condition of concurrency could be relieved through the mechanism of presequencing, which entails the ordering of processes to execute serially. Although this would solve all the problems of concurrency, it would lead to an intolerable level of inefficiency.

Preordering can prevent the condition of circular wait. This technique requires that each data granule be ordered in some manner and that requests for data granules follow the given ordering. The major pitfalls of preordering are the need for a means to present the ordering of data granules to all users, the lack of data independence and the impractical restriction that the user access data in the specified order.

Another condition for deadlock specifies that no preemption be allowed. The obvious solution to this condition would be to allow preemption. However, the preemption of data from a process that has already begun to operate upon that data would require backing out its changes.

The final condition for deadlock, that of allowing additional locking, can be relieved by requiring that each process start out by requesting all of its data at one time (the preclaim strategy). This is difficult, however, since the first data access may determine what data will be needed later.



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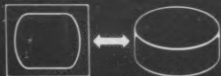


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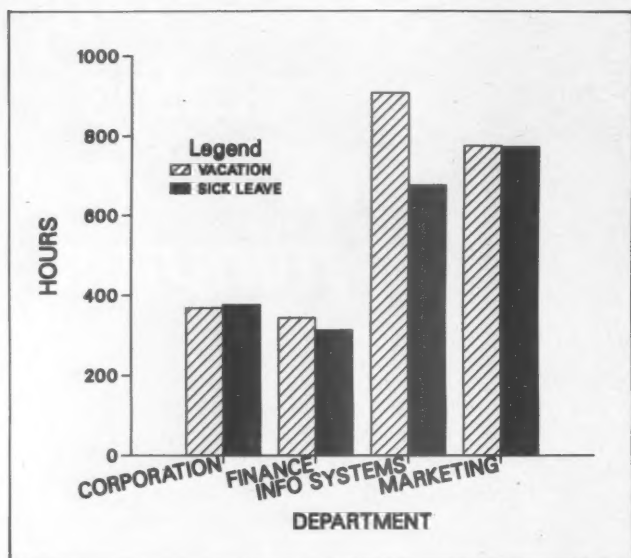


Figure 1: Vacation and Sick Leave Accruals by Department

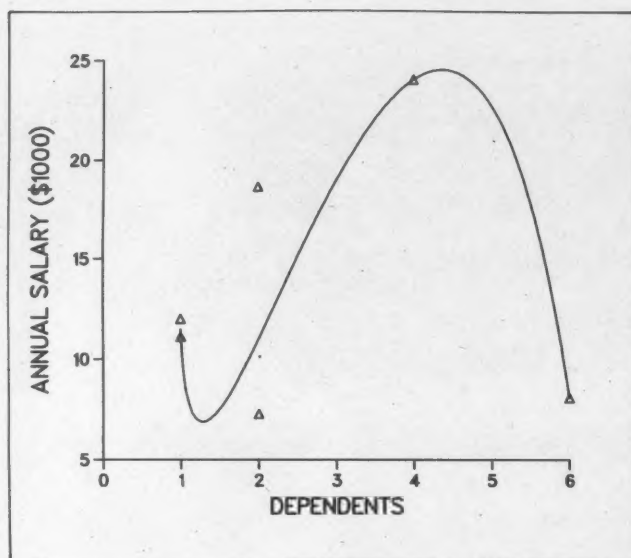


Figure 2: Average Company Salary

DBMS, Graphics Complement Each Other

By David Sokolwer

Special to CW†

It is becoming increasingly obvious that data base management systems (DBMS) will become the primary tool by which all on-line data will be stored and retrieved.

At the same time, the dramatic reduction in the cost of computer graphics devices within the last several years has allowed business graphics to grow.

In the process of producing a graph, however, graphics software has to be supplied with a source of data from which the graph will be generated. In most cases, the data will reside in a file that will not be in an acceptable format and/or some sort of selection/merging process will be required.

There are two common approaches

to overcoming this problem:

- Produce a data extraction program that requires a programmer to write, test and debug a program which creates a set of data for only that one request.

- Manually create a graphics input file by reentering the data supplied by a previously generated computer report.

Both methods require additional trained people and slow reporting time. They do not meet changing management needs and are error-prone. Most importantly, the manager is no longer capable of producing his own charts. Programmers and/or secretaries must now be brought into the loop to write data extraction programs or produce reports and enter the data manually.

This Achilles' heel of graphics soft-

Much of the attention on information resource management has centered around the difficulty of collecting, indexing and storing an organization's information. Yet disseminating this information in a way that is intelligible and useful for end users is just as important. Merging data base management and graphics software may be a substantial step toward solving this problem.

ware is just what DBMS do best. They have high-level, easy-to-use facilities that allow unsophisticated individuals to collect, merge, select and update their data. Most also have built-in report generators.

DBMS' weakness is that they are poor at displaying data trends, a feature that graphics easily accomplishes.

The merging of DBMS and graphics software also provides management with a powerful capability — "what if" analysis. The power of a DBMS to select and limit data will allow managers to evaluate easily alternative plans. Most management graphics to date have been used to present information, and a resulting decision-making process takes place without further variation of the graph.

Most available DBMS and graphics software require that users learn some form of procedural syntax to operate the system. What is needed is a facility that isolates users from both the graphics and data base software. Thus, a data base/graphics bridge would allow the user to describe the desired output in graphics terms and let the system worry about relating it to the DBMS file(s) structure.

At minimum, a DBMS/graphics system should include the capability to produce bar, pie and plot-type

charts. A mapping option is nice but not mandatory. It is important that the facility has the flexibility to allow a chart to be cosmetically modified from, say, a bar to a pie chart without requiring a re-collection of data from the data base.

With the exception of knowing how to read a data base description, an individual should not be required to know any data base or graphics syntax. The biggest advantage of conversational design is that it notifies users of an incorrect entry and helps them correct their errors.

It is easier for the user if he only has to answer questions that directly relate to the ultimate objective: producing a graph. The system should be designed to provide as many defaults as possible to limit the number of entries required for the beginner. Again, there should be flexibility so that the more experienced individuals can override the defaults.

There are three choices for prompting inexperienced end users in defining what they would like to see displayed and the data selection process they would like invoked:

- **Data Summarization.** Specify a DBMS field and let the data base supply a summary list of only the unique (distinct) values. For example, in Figure 1, the data base field "department" was entered, which produced a display of each different (distinct) value for that field. There may have been hundreds of records containing the data value of "corporation," but it only appears once on the chart. The data base software automatically summarizes the values that will be displayed in the chart.

- **Manual Selection.** There are many situations where the user wishes to combine several distinct data values together and give it a name other than what is in the data base. Figure 2 is an example of this. The field "except" contains a variety of job classi-

(Continued on SR/32)

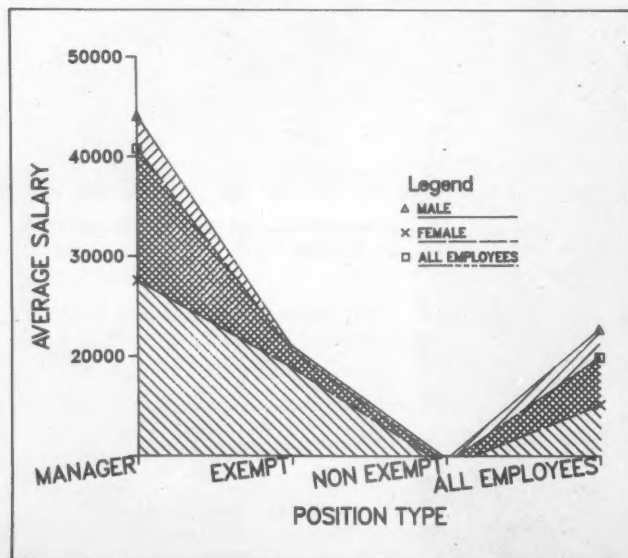


Figure 3: For the Department of Finance

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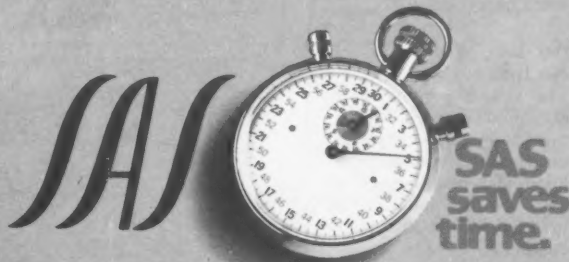
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DBMS, Graphics Capabilities Go Hand in Hand

(Continued from SR/30)
fications including programmers, documentation writers and engineers. The interface allowed the chart maker to enter the X-Y axes names and the selection criteria for the data extraction process.

• **Raw Data Display.** When working with numeric data there are many occasions to

'At minimum, a DBMS/graphics system should include the capability to produce bar, pie and plot-type charts. A mapping option is nice but not mandatory.'

chart raw, unsummarized data. All that is required is to enter a data base field or an

arithmetic computation, including one or more multiple data base fields to de-

scribe the X-Y axes. Figure 3 on Special Report/30 was produced using this method.

Data summarization and manual selection can also be used in defining legends on a graph (if a legend is even desired). All that was required to define the legend in Figure 1 was the data base field named "leave type."

A mathematical calculation is required to determine the height of the bars (bar chart) or the slice of the pie (pie chart). The entry should be simple enough to use so that a novice can just request "count employee hours." Again, the more sophisticated individuals should have the full computational capability to include complex computations, including the use of intermediate results.

It should be possible to imbed one or more data base fields in the title line(s), so that each time the value in the data base changes there will be an automatic generation of a new chart. This power to generate multiple graphs with the effort that it takes to describe the format for one demonstrates the power of marrying DBMS and graphics technology.

Hidden Powers

If designed correctly, conversational systems also should include "hidden powers" that allow more experienced staff to use the full capabilities of both the DBMS and graphics software. Examples of this include altering the size of a title or shading pattern in the graphics software or performing a difficult data correlation technique in the DBMS software.

Graphs are good when searching for trends or attempting to get "the big picture." However, management reviews of graphs often result in the request for a backup report to explain a disturbing trend found in the graph. If the interface was designed correctly, the same individual, with no additional training, can also generate traditional management reports.

Once a graph has been found to be useful it should be unnecessary for the user to have to return to the conversational interface the next time the graph is needed. A Save facility can allow for rapid and automatic production of a set of graphs, both at scheduled times and/or each time the data base is significantly updated.

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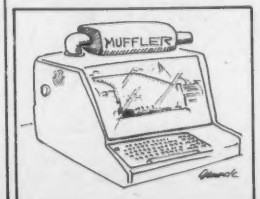
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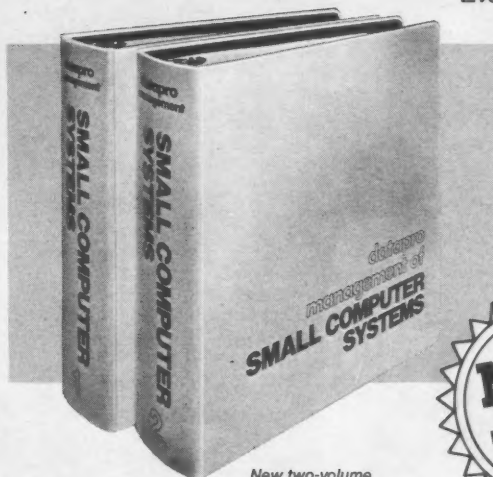
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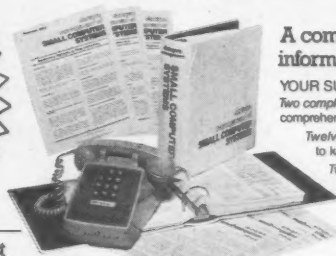
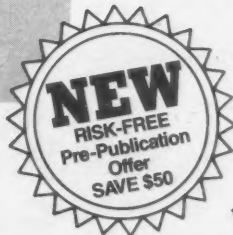
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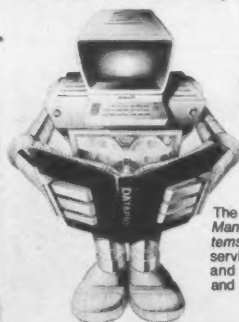
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DBMS Results in Quick, Painless Drug Research

LA JOLLA, Calif. — Quick and painless drug research is the result of a data base management system (DBMS) installed here that has rendered paper recordings and manual analysis of data obsolete.

In the Division of Toxicology at Science Applications, Inc. (SAI) in La Jolla, Calif., DP manager Ken Fite believed there was a better way than manual analysis techniques. Fite has automated the information gathering and processing activities with a computer through a variety of turnkey applications. These applications have been developed using System 1022, a DBMS made by Software House, Inc. of Cambridge, Mass., for use on Digital Equipment Corp. Decsystem-10 and Decsystem-20 computers.

SAI, an employee-owned scientific research and development company working in the areas of energy, environment and health, high-technology products and national security, has annual revenues of over \$200 million. Organized into self-contained divisions providing products and services, SAI's environmental and health activities include land reclamation, waste management, health program development, air- and water-quality monitoring and toxicology screening.

Extensive Testing Required

Thousands of new chemical compounds are developed by chemical and drug companies every year. Before a company can place a new chemical on the market, federal regulations require extensive testing to determine what, if any, toxic effects the compound will have on people who are exposed to it. These tests look for everything from direct, obvious side effects to more subtle, long-range effects, including effects on pregnant women and their developing children. Effects of each new chemical are observed in two basic ways: by laparohysterectomy and behavior.

In laparohysterectomies, autopsies are performed on pregnant animals, their fetuses are removed and examined. Here, Fite noted, "We look at the morphology [structure and form] of the fetus to see if there is any particular malformation, such as absent lung lobes, heart lesions, split or fused ribs." Particular attention is paid to the mother's reproductive system and the respective weights, structure and positioning of developing fetuses.

The other half of SAI's teratological testing is neuro-behavioral. For these tests, fetal development is not interrupted. During the first several weeks following birth, SAI observes and tests for different physical and learning capabilities, watching for both impairments in learning and deviations in developmental signs from statistical norms.

Wherever differences are found, they are noted. At the conclusion of a study, this and other data is analyzed to determine correlation risk.

SAI is performing an average of two new studies each month. With an average of 130 animals/study, a

study duration of two months and daily observations for each animal, large volumes of data accumulate rapidly. And since old data is often used in other contexts, the total data library is quite substantial.

Data Management Needs

The Division of Toxicology, in which teratological studies are being performed, has access to a DEC-10 computer. After searching for a DBMS that could handle its data management needs, be used directly and also serve as a developmental tool, SAI selected the System 1022 from Software House.

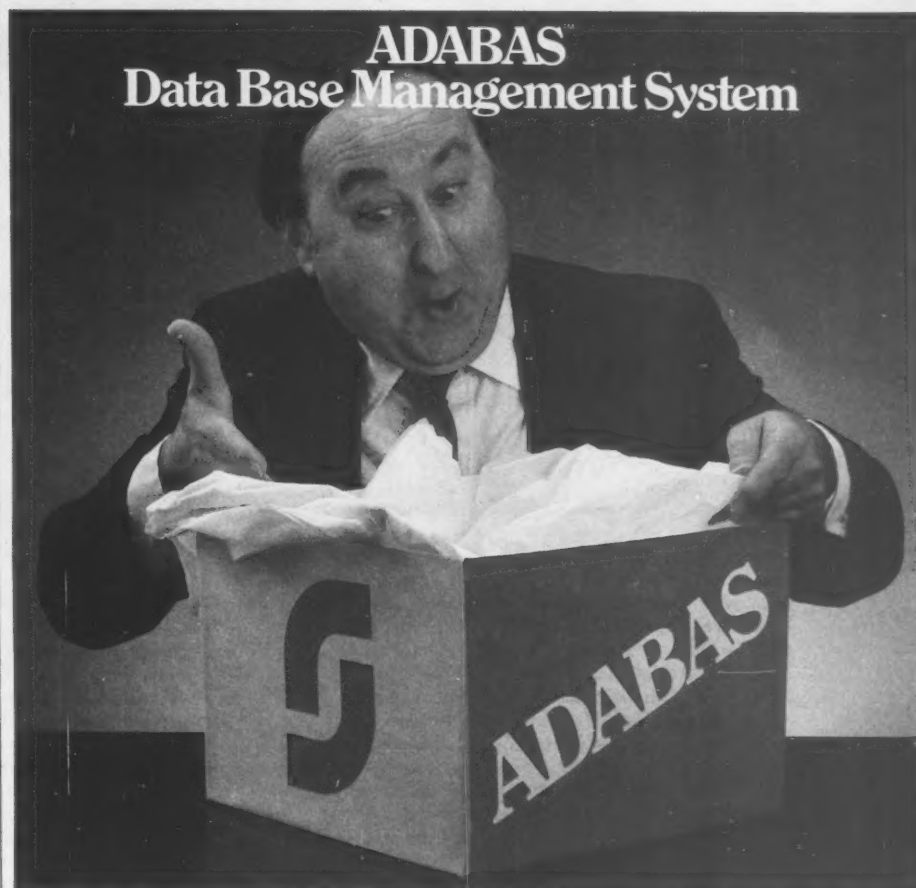
'DP manager Ken Fite believed there was a better way than manual analysis techniques. Fite has automated the information gathering and processing activities with a computer through a variety of turnkey applications. These applications have been developed using ... a DBMS.'

Fite used the 1022 as the core facility and building tool in creating on-line DP systems for his group. "I pro-

duce turnkey systems," he noted. "Most of my users have no computer experience whatsoever. I provide standard procedures, often using the special-function keys on the terminals."

Fite believes that the System 1022 has been responsible for major savings, both in effort and in his budget. "We're saving anywhere from 60% to 80% in three areas: new programming time and file and program maintenance. That adds up to more time we can spend productively on new applications and in getting systems up and running far more quickly."

(Continued on SR/38)



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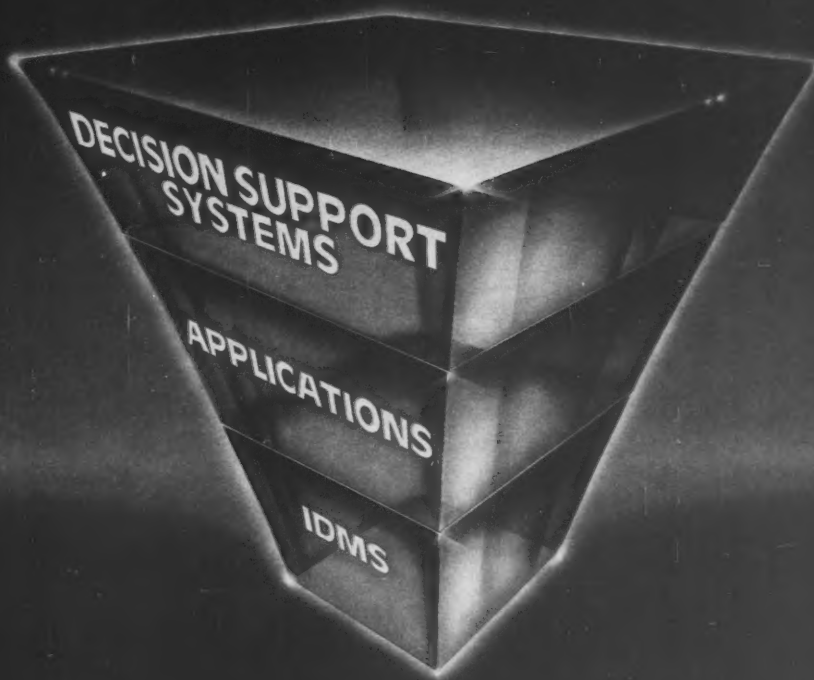
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My operating environment is

Cullinane software works with all IBM 360, 370, 30XX and 43XX computers — or plug compatible equivalent.

DBMS Remedies Manual Analysis of Data

(Continued from SR/35)

ly. Standardizing our file interfaces and structures through 1022 also means we can add new programs right in."

Specifically, 1022's impact on the creation of systems for the teratological studies was major. "1022 allowed us to get up and running with on-line systems in a matter of months. And I know at other companies they're taking a year — even several years — to put systems together from the ground up," Fite said.

System 1022 serves Fite as the kernel of his toxicology systems. "Building up from 1022, I've put together a number of other tools to provide the specific functions we need," he explained. "Also, I use 1022's ability to process command files. Often, this turns out to be a faster way for me to generate programs."

SAI's on-line toxicology systems do everything from tracking animals to producing final reports. "When we work with the live animals, we bring terminals directly into the animal processing rooms," Fite explained. "The lab technician logs in before doing anything else and selects an activity from the menu displayed on the screen."

System Prompts

"From here, by checking against data base entries, the system will prompt the lab tech as to what animals must be retrieved, what needs to be done to them, etc. The operator enters data which is immediately placed into the data base. For our weighing process, we use Mettler PK300 and PK4800 balances, which send readings directly to the DEC-10."

Going on-line with centralized DP facilities has brought many improvements to SAI's procedures, when compared to operations where infor-

mation is on paper, Fite observed. "One thing our systems provide us with is constant, complete checking and cross-checking of data as we enter it. For example, we have dictionary files and routines. If an operator enters a condition like 'cold,' via 1022 the dictionary listings are checked, and the system branches to specific follow-up questions. So we both check entries for acceptability and determine subsequent queries, this way."

Another example of SAI's checking: "When we weigh the animals, our program compares the reading against the most recent weight re-

cord. If there's a difference of more than 5%, the operator is notified. The ability to use prior information to cross-check new data coming in is essential to the success of our operation."

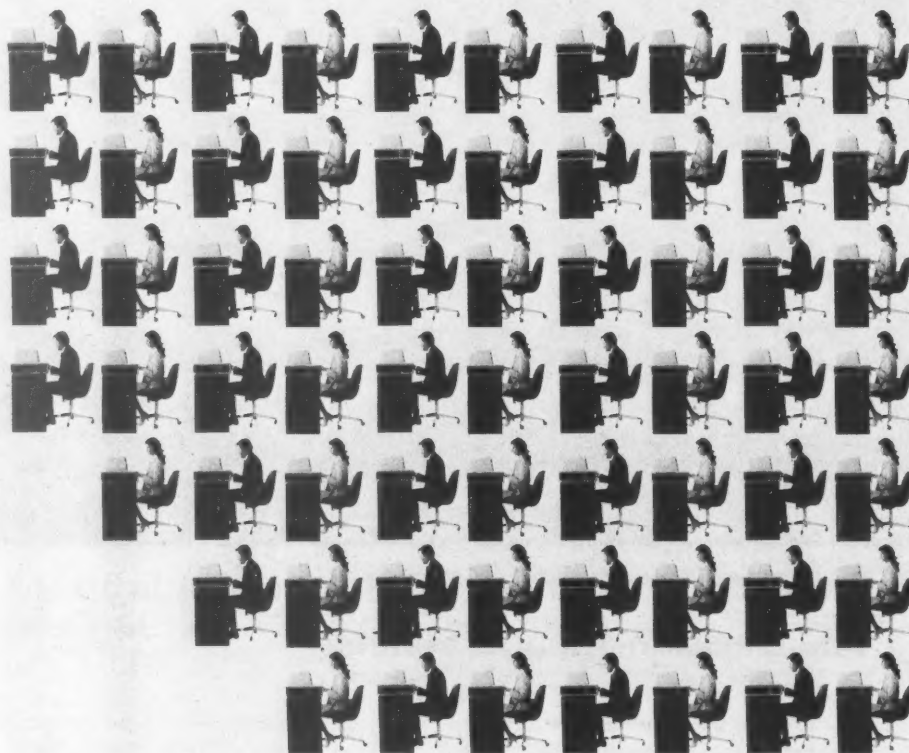
Process Simplified

Of course, once data has been gathered, all manner of statistical analyses must be performed and reports prepared. System 1022, along with its custom interface to the statistical program package SPSS, has simplified and accelerated this process as well.

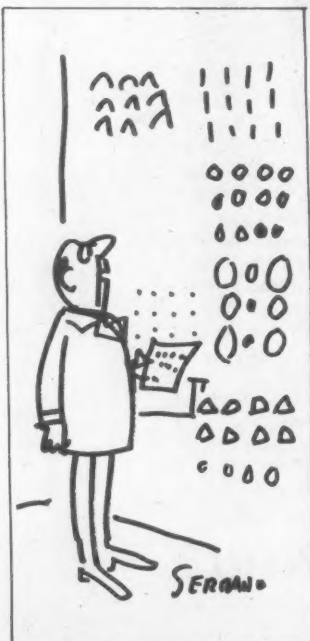
"Once we get the data in, it's a mat-

ter of minutes until we get statistics," Fite said. "Doing this by hand would take a week or so each time around. This is one aspect of the systems that everybody here appreciates."

Now that the laborious task of number-crunching has been relegated to 1022, SAI's Division of Toxicology is able to do "basically all the analysis we want," Fite reported. "This is making our research go much faster and improving the depth of our studies once the data is all in. We're looking towards turning around final reports to our clients, including statistical tables, in a matter of days instead of months."



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Provides Internal Resource Controls

T/S Firm Uses DBMS to Track Its Computers

SEATTLE — When you are providing commercial time-sharing services to hundreds of companies, somewhere along the line you have to keep track of your own computer equipment.

Boeing Computer Services Co. (BCS), which counts among its customers the entire 100,000-employee Boeing Co., is using Intel Corp.'s System 2000 data base management system (DBMS) for an internal Resource Control and Accountability (RCA) System.

BCS has hundreds of software pack-

ages in its remote computing service (RCS) repertoire, which are made available to users at a variety of support levels. Users may lease a read-only copy of a software package from BCS, request special development work and purchase a complete set of documentation, even hot-line and sales support.

BCS' DBMS holdings include four copies of Intel's System 2000 DBMS, two for Control Data Corp. mainframes and two for IBM. One of each is used for RCS customers, one for internal development on CDC hard-

'BCS' DBMS holdings include four copies of Intel's System 2000 DBMS, two for Control Data Corp. mainframes and two for IBM. One of each is used for RCS customers, one for internal development on CDC hardware and the last IBM copy for three RCA applications.'

ware and the last IBM copy for three RCA applications, which include a purchasing system, an accounts payable system and a system supporting inventory and internal cost distribution functions.

The RCA system is based on System

2000 DBMS and IBM's CICS and run on an IBM 3081 at the BCS Kent Data Center near Seattle.

Three Applications

"The first application we put in place was called ERMS, for Equipment Record Management System," noted Dave Clark, supervisor for BCS Corporate Support, the group that developed the inventory and cost distribution system. "ERMS is essentially an equipment inventory system with a strong finance flavor. It contains a wealth of equipment information for every piece of computing equipment BCS owns or leases."

"The ERMS data base contains approximately 133 million bytes of information and has over 600 data base elements. It uses System 2000's multiuser multithread, the data dictionary and report writer feature, in addition to the Programming Language Extension (Plex) and query language (Quest) facilities. Currently there are over 40 terminals accessing the ERMS data base. Nontechnical users use Intel's query language and CICS screens to query and data base system," Clark said.

"The second system implemented was the Subcontract and Procurement System [Spro], which handles all the data supporting the procurement process: vendor information, prices, terms and conditions, delivery schedules, etc. Spro is the entry point for equipment that eventually becomes resident in the ERMS file."

"The next component is Accounts Payable On-Line [Apol], which interfaces with Spro and ERMS. Spro provides terms, conditions, rate information and vendor addresses to Apol. ERMS is used to verify that the invoiced equipment is in the inventory. Then, Apol produces checks for vendor payment," Clark concluded.

Systems Work Together

The three systems work together to manage all equipment controlled by BCS. After budget approval and technical evaluation and engineering, the information is entered into Spro and a purchase order is produced. Buyers and procurement managers are the primary users of Spro.

Once received, the equipment becomes part of ERMS and is tracked until it is released or surplus. ERMS is the most end-user-oriented of the systems and has the widest number and variety of users: technical, finance, procurement and facilities personnel all use ERMS to follow resource usage for their particular responsibilities.

When vendor invoices are received, the Spro and ERMS systems are consulted by Apol to verify that the equipment is in the inventory and
(Continued on SR/40)

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Distributor Goes Relational to Modernize Files

CLEVELAND — When Bearings, Inc. went shopping for a data base management system (DBMS) to replace its bill-of-materials software products, the company had two major criteria: The data base had to be relational, and the software had to be integrated.

Bearings, a diversified industrial distributor that distributes more than 250,000 different parts and 3.2 million line items throughout the U.S., wanted to modernize its accounts receivable and product inventory files. Company officials realized that implementing a relational data base and integrated software would provide better performance and flexibility in their high-production environment.

After careful evaluation, Bearings chose Datacom/DB from Applied Data Research, Inc. (ADR) as its underlying DBMS, and later added ADR's Data Dictionary, Data Query and Data Reporter. Bearings had previously used ADR's Librarian and Vollie for various other on-line applications.

"We found that IBM and others were migrating to relational data base processing," said Robert Falkowski, assistant director of DP, "but we were impressed that Datacom/DB was already a relational data base. We liked its ease of installation and ease of use. We also liked ADR's inte-

grated data base management approach."

According to DP Director Bryan H. Sanders, the conversion from a data base and organization maintenance processor (Dbomp) to Datacom/DB was one of the "fastest and smoothest" ever made at Bearings. "ADR provided a utility to unload Dbomp files and reload them into Datacom/DB," Sanders explained. "We kept the record and field sizes the same, except for some numeric field sizes."

Particularly Impressive

Particularly impressive was Datacom/DB's creative use of disk space for disk storage, which enabled Bearings to postpone acquisition of addi-

tional disk storage equipment. "The compression feature is excellent at saving disk space," he said. "We now use only 39% of the space we used before." The savings translates to 1.5 times 317M bytes of information, or about 475M bytes.

Using ADR's data base software, Bearings reduced its accounts receivable file to two files from five. The company's product files were reduced to one file on 4,000 disk tracks from three files on 13,000 disk tracks.

Bearings, which uses an IBM 4341-1 Group 2 operating under DOS/VSE Release 2, now updates its receivable data base in 60 to 65 minutes nightly, instead of the four to six hours that were required previously. The prod-

uct file, which used to be updated in 2½ to three hours, is now updated in less than 15 minutes.

With Datacom/DB, Bearings also is able to do concurrent multiple updates. Any program, on-line or batch, can access any file for review or updating, enabling Bearings to get more work done in a more efficient manner.

"The data base is the vehicle that will enable us to grow," said Sanders. "Using ADR software, we plan to develop a true management information systems department. We'll be able to give our users and our management timely information. Our top management has been 100% behind our efforts."

DBMS Manages Hardware for T/S Firm

(Continued from SR/39)

that the invoiced amount is proper and correct. The primary users of the Apol system are accounting personnel.

Each of the three systems has extensive tracking and management reporting capabilities built in. Audit trails record all critical changes made in data base values. Spro, in particular, coordinates the extensive flow of paperwork that accompanies any procurement, providing extensive records.

"We are very pleased with the ease of application development on System 2000," Clark said. "Plex is fairly straightforward and quite easy to learn. We were on a deadline to produce, and our core group of programmers came up to speed very quickly."

"Our support requirements for the systems are minimal. We have a dedicated support staff of four: two people concerned with data management, a group librarian and a user interface/user trainer. System programming support for CICS and Sys-

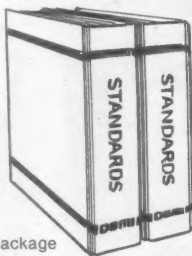
tem 2000 is provided on a part-time basis by a central technology group.

"The system is still evolving," Clark said. "New systems will continue to be added according to user needs. Currently, our users are scattered all over the Puget Sound [Washington] area, where the largest concentration of computing equipment exists. Efforts are currently under way to expand the use of the systems to manage computing equipment resources in other Boeing locations worldwide."

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Specific Capabilities Necessary in Future DD/DS To Back User Requirements

By Bernard K. Plagman

Special to CW†

Specific features and capabilities will be necessary in future data dictionary/directory systems (DD/DS) to support user requirements in the '80s. Figure 1 illustrates a matrix of future DD/DS requirements vs. desired features and capabilities.

DD/DS are just beginning to include features designed to support systems development life cycles and project control activities. Special entity types and attributes are needed, and specific methodologies for systems and data base design must include documentation and analysis aids.

Entities that the data dictionary must incorporate for the future include those that describe the process of conceptual design. The new entities must describe business functions, data clusters, transactions and relationships among new as well as

existing entities. These high-level design entities also must be able to be "linked" to the detailed design-level entities.

Additional entities also will be required to describe adequately the on-line telecommunications and distributed processing aspects of modern-day information systems.

Future Data Dictionaries

The data dictionary of the future will require new attributes to describe new entities, as well as some new attributes for existing entities. Specifically, it will require special attributes to support the financial aspects of project control, which must reflect actual vs. budgeted resources for specific design activities associated with the environment's entities.

With a full complement of entities covering data and systems, the data dictionary of the future will be able to support data base design techniques, structured methods and other design approaches.

Finally, the future data dictionary will provide comprehensive documentation so that the auditor can meet requirements for reviewing and understanding the systems.

The active DD/DS of the 1980s will use meta data generation facilities to provide better support in terms of scope and degree of activeness, as well as to include more meta data generation for DBMS, transaction processors and other components.

In the area of meta data generation for data base management systems (DBMS), data dictionary vendors will endeavor to enhance their packages to include such things as Sysgen support and the ability to generate meta data for data base restructuring and reorganization activities.

Thus, the scope of activity can be expected to increase significantly in the 1980s. Eventually the data dictionary will be capable of generating meta data on a regular basis for developing on-line screens, managing terminals and lines, edit and validation routines and application program generators.

The continuing trend toward automatic program generation will be furthered by the ability of the data dictionary to support this process with meta data.

Meta data generation will also be an important factor in ensuring that automated systems design and analysis tools gain widespread acceptance.

Further developments may involve the use of the data dictionary to support test data generation procedures and to control the test environment in general. Here, it would control all the meta data for the test system and drive it just as it would the production system. The data dictionary would be used to segregate activities, transactions and data between test and production environments.

In addition, extended use of the meta data base during program execution will yield a higher degree of

User Requirements	Features and Capabilities of Future DD/DSs			
	Facilities to Support SDLC & Project Control	Comprehensive Metadata Generation	Dynamic Collection & Reflection of Metadata	User-Friendly Interfaces
Support for Data Resource Management	More system entities Conceptual design entities	Metadata for system planning tools	Not applicable	Systems planning interfaces
Tool for DA/DBA of the Future	Communications & on-line entities Support for project control DB design support Structured methods support	Complete DBMS metadata Metadata for TP, RPG, query processor & program generators Metadata for automated systems development Execution-time bending	Support performance measurement Support restructuring & reorganization Collect metadata: accesses, response times, device use	Comprehensive DDL Interactive support
Tool for Audit & Control	Documentation for SDLC Documentation for project control	Metadata for generalized audit software	Reliable operational metadata	Query & RPG support

Source: Plagman Group, Inc.

Figure 1: DD/DS Features and Capabilities Satisfying User Requirements

DBMS Changes To Impact DD

Because the data base management system (DBMS) is closely related to the data dictionary/directory system (DD/DS), changes in DBMS technology will have an impact on the DD.

Specifically, the DD/DS of the future will be affected by the following developments:

- **Data base computers.** The development and acceptance of the data base computer will influence where the meta data base will be partitioned, with some portions in host and others in the back end. Conceptually, it might be expected that dictionary (logical) meta data will be in the host; directory (physical) meta data in the back end.

- **Distributed data base management.** Requirements for supporting data bases in a distributed processing environment will lead to the development of a network DBMS (NDBMS). The relationship between the NDBMS and the DD function of locating data across nodes of the network must be established in the development of this state-of-the-art technology.

- **Associative memories.** A major technological breakthrough in storage technology has been the introduction of associative memories. The ability to retrieve data by using only the values of keys and other data elements holds enormous potential if it can be done at random-access speeds. The time is here when this will be true.

From the perspective of the DD and its small but extremely complex meta data base, associative memories present the potential for storing the meta data base on a device that can offer almost unlimited capability in manipulating the complexity of interentity-attribute relationships.

DBMS-DEPENDENT DD/DS

Hardware Vendors

IBM — DB/DC Data Dictionary
Burroughs — Under development
Honeywell — Under development
Sperry Univac — First release under test use
CDC — Data Catalogue 2 (adapted)
Digital Equipment — Under development
ICL — ICL Data Dictionary

DBMS Vendors

Cullinane — Integrated Data Dictionary
Intel — Integrated Data Dictionary
Cincom — Total Dictionary (TIS)
Software AG — Adabase Dictionary
Applied Data Research — Datacom DD
Infodata — Edict

Independent Vendors

UCC — UCC TEN (dependent on IMS)
Haverly Systems — DCS III

DBMS-INDEPENDENT DD/DS

Independent Vendors

MSP, Inc. — Datamanager
TSI Data Catalogue 2 (IBM, Burroughs & Sperry Univac)
Arthur Andersen & Co. — Lexicon (no longer marketed)
M. Bryce & Associates — Information Resource Management System

Source: Plagman Group, Inc.

Figure 2: Vendor Offerings of DD/DS Packages

activity of the data dictionary. This, in turn, will produce a greater level of control over the execution process.

In response to the requirement for easy-to-use information systems, the data dictionary will develop user-friendly interfaces. Specifically, these will include a comprehensive and unified data definition language (DDL) that is not fragmented by the individual styles and idiosyncracies of particular DBMS and/or programming languages.

Implementation Issues

The important technological trends in data dictionary are related to the following implementation issues:

- Architectural placement of the DD/DS in a data base environment.
- Reliance on the DBMS for support.
- External technological trends.

It is widely accepted that the data dictionary is an important, independent component of the data base environment. A good indication of this acceptance can be found in the commercial marketplace: There are more than 10 commercial data dictionaries

that stand as architecturally independent software components (Figure 2).

In the future, acceptance of the data dictionary as an independent component of the data base environment will be reinforced for two reasons. First, the independent data dictionary is necessary to support distributed data base management with dissimilar implementations on nodes of a network. Secondly, the independent data dictionary is necessary to support the non-DBMS user.

Commercial data dictionary vendors (and in-house implementors) often rely on the DBMS to support their package. It should be noted, however, that the DBMS is being used to support an architecturally separate component. Thus, while the data dictionary might be dependent on the DBMS, the former is separate from the DBMS in the data base environment.

Plagman is president of The Plagman Group, Inc., a New York-based consulting firm. This article was based on his book, *Data Dictionary/Directory Systems: Administration, Implementation and Usage*.

University Switching From Batch To On-line Operation With Aid of DBMS

CEDAR FALLS, Iowa — The University of Northern Iowa here is moving from a batch system to an on-line environment with the help of a data base management system.

Facilitating the switch has been the use of Cincom Systems, Inc.'s Total Information System (TIS) data base software products.

"TIS is helping us implement our

long-range objectives," Dale Hilliard the university's manager of DP, explained. "We've already implemented systems to monitor purchase-order activity, to facilitate student course registration, to support payroll activities and to maintain personnel data about benefits, vacation and sick leave.

"TIS makes it practical to refine and

continue to add to the universitywide information network in a step-by-step fashion. Through the In-Line Directory and TIS Logical User View concept, we can update and expand our data relationships without significant impact on existing applications. So we can plan for the future expansion of the data bases knowing that our current programs will not suffer," he said.

Ten Components

TIS is comprised of 10 integrated components, including the In-Line Directory and Logical User View.

"Right now we are about midway through the process of implementing several major systems under TIS," Hilliard continued, "and TIS has kept us on schedule. We can maintain this ambitious pace because we are able to bring up new applications in substantially less time with TIS, compared to the time it would take with traditional data base and teleprocessing systems."

The switch to Cincom's TIS coincided with the university's move from a strictly Cobol batch environment to an interactive on-line environment, a move which it had wanted to accomplish as quickly as possible.

"As the university expanded over the years, it became more and more apparent that a new approach was needed to meet our information requirements," Hilliard noted. "We considered designing a custom system based on a traditional data base system, but found many of the features we wanted already developed in TIS. Its integrated components allow us to satisfy many different types of information needs efficiently and accurately."

And, we are able to develop applications much more quickly through the facilities of TIS. The move to the on-line environment has been reasonably smooth, and we are able to plan for future information needs at the same time."

The university has installed the full complement of TIS components: Directory, On-Line Directory Maintenance, Utilities, On-Line and Batch Query, Comprehensive Retrieval, Communications Monitor, Cobol-XT support, Task Level Recovery and Advanced Mapping. The system runs on an IBM 4341.

Development Efforts Launched

Since the installation of TIS in December 1979, "we have been able to provide the development and support capability of a much larger shop with a staff of only nine analysts and programmers," Hilliard said. "This means that we have been able to implement some fairly major development efforts without a large investment in manpower, due to the capabilities and flexibility of TIS."

"For example, our development staff has already been able to implement three major systems in about half the time it would have taken with a traditional system. The remaining time can then be spent on maintenance and on meeting ad hoc



The University of Northern Iowa is moving from a batch system to an on-line environment.



Registration and transfer information at the University of Northern Iowa are both handled through applications developed using TIS.

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N.Y.C. Housing Warms Up to Data Base System

NEW YORK — For millions of apartment dwellers, the onset of cold weather ranges from a minor inconvenience to a potentially life-threatening problem. But because of a round-the-clock hot line linked to a comprehensive housing information system, New York City's Department of Housing Preservation and Development (HPD) responded to over 440,000 housing complaints last winter within 24 hours of each call.

HPD's data base system, which uses Software AG's Adabas and Natural, has been credited with helping to save the lives of numerous elderly and shut-in tenants by speeding the response to heating and other building emergencies. In addition, it is estimated to have saved the city over \$1.6 million a year by eliminating redundant housing inspections and improving the collection of fines from landlords with code violations.

According to Andrew Cooper, HPD's director of management services and information systems, the system went on line in the early '70s when large on-line data bases were relatively rare, and the notion of encompassing every multiunit dwelling in New York City in a single on-line system seemed remote. But after the Adabas system won a critical benchmark in 1973, HPD became Software AG's third U.S. customer for the product.

System Feared at First

By 1975, on-line intradepartmental inquiry (via CICS) was available for nine files, including the 800,000 record code violation file. Yet there were still fewer than 200 on-line transactions a day — largely because, as Cooper says, "People were afraid of the system. They had to be convinced that information was as correct on-line as it was in batch mode." Until that happened, the question of bringing the system to the public was academic.

By the time the system finally went "live" as a full-time on-line complaint system in December 1979, things had changed considerably. The volume of housing complaints had reached 400 per hour at peak periods — overwhelming the 54 operators who were assigned to record the information manually, convincing city administrators that an on-line system was worth the gamble. The subsequent development of several pieces of software, most notably an address translator, deflated much of the gamble by enabling system end users to access the building files from information readily obtained from callers.

Since the system's implementation, and despite steady increases in the number and variety of complaints received, response time has reportedly improved 300% over the manual system — with a third fewer people taking calls. As a result, other cities from around the globe have been looking at New York as a model of how on-line housing data bases can be used to coordinate the delivery of vital services.

One of the keys to HPD's success has been its ability to hire people

with no computer experience at all and then to train them to become operators in a few days. "Adabas is not that hard to learn," Cooper said. "We have many operators who literally come in off the street as marginally employable workers. Yet by the end of their second or third day, they're sitting down at CRTs and responding quickly and accurately to a wide range of situations."

Tremendous Demands

The volume of calls places tremendous demands on the system as well as on the operators. Weather forecasters are predicting that this winter

will be even colder than last year's, during which the department handled over 131,000 complaints in January alone, with peaks of over 1,100 calls per hour.

Each new call to the system causes information to be entered on the caller's borough, street address, building, tenant's name, complainant's name, data, time of day, current temperature, number of the terminal receiving the complaint and nature of the complaint (inspection, emergency repair, violation notice and so on). Once entered, the information is available to dispatchers in HPD's five borough offices, with redundant

calls automatically sorted so that inspectors, fuel trucks and repair crews can be routed wherever they are most needed.

To cope with this demand, HPD's hardware includes redundant IBM 4341 systems with software designed to provide a comparable measure of protection against the unexpected. The goal is to have the system able to remain on-line 24 hours a day for the duration of even the most extended cold-weather periods that New York typically experiences. Maintenance time averages ten hours per week, with the hours selected for lowest anticipated demand.

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Relational DBMS Tunes Up Cable TV Firm

DENVER — A relational data base management system (DBMS) has meant a major boost in applications development productivity for United Cable Television Corp. here.

United Cable is one of the oldest and largest cable television firms in the U.S. Its sales currently exceed \$100

million and its employees now number 2,000 — up 400% in only three years.

With a compounded growth rate of over 50% from last year alone, United Cable found its DP needs were growing faster than the existing staff could handle.

Operating over 30 cable systems nationwide and with

expansion into over-the-air subscription television, customer tracking, billing and royalty fee calculations were placing tremendous demands on the DP staff.

Expansion Creates Problems

Until recently, United's DP operations were rather traditional, focusing on account-

ing and payroll. Recent acquisitions and new operations have resulted in the need to handle up to 1,000 phone calls per day in one area alone.

"Because of our rapid growth and constantly changing information requirements, I knew that only a relational system could

provide the ease of use and flexibility we needed," Paul Bass, director of information services, said.

His search for software turned up the only relational data base system designed for the Hewlett-Packard Co. 3000 system, which United Cable uses — the Relate/3000 from Computer Resources, Inc.

One of the first applications for Relate was to calculate complex monthly royalties paid by United Cable for basic and premium pay services such as Home Box Office.

According to Bass, "These payments total over \$15 million a year, and an error of only .5% could produce an overpayment of \$75,000 alone. In three hours we had created the procedures to do the basic pay calculations. The same project with Cobol and Image [HP's data base system] would have taken at least 30 hours."

Introducing relational technology has fit in well with existing Image/3000-based applications. A large portion of DBMS usage is for pulling reports out of existing Image, Ksam and HP's Multiprogramming Executive files with the Interactive command language.

One Relational Benefit

One benefit of a relational DBMS is that, due to simple data structures and an English-like command language, nontechnical users can develop their own systems.

Two of the many uses outside the DP department include a fleet management system for maintaining information on all United Cable's vehicles nationwide; and a catalog system of all legal documents: what they are, where they are and when they are due for renewal. This enables the legal department to keep track of the numerous legal documents that result from operating over 30 cable companies, according to United Cable.

The programming staff is also pleased with Relate. Ad-hoc information requests that were not practical before can now be satisfied in a matter of minutes. Kevin Cox, a project leader, states "We are able to respond to user requests much faster than ever before."

Bass claims, "We evaluated several alternatives, including IBM and Tandem Computer, Inc. computers with their relational systems. And based on our analysis of Relate, we decided to stay with Hewlett-Packard hardware."

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Relational DBMS Backs U.S. Combat Systems

VIRGINIA BEACH, Va. — A system to support configuration management of U.S. combat systems software was developed here by Comptek Research, Inc. based on a relational data base management system (DBMS).

Comptek is an engineering and equipment company that designed Relational Configuration Accounting Support Program (Recasp) to offer a configuration management accounting system program that can be tailored to individual customer requirements. The program employs Relational Technology, Inc.'s Ingres DBMS, which provides a structural base for developing applications modules.

This structure also permits data manipulation and control to facilitate user understanding and operation. The program can be adapted to specific status accounting requirements without totally overhauling established programs or data bases.

"With the recent acquisition of Ingres, Comptek has a data base management capability for a wide range of software support program customers," Don Wollett, Comptek's Engineering Services Division marketing manager, reported.

Selection Procedures

Gene Marlinghaus, Comptek's lead systems engineer, described the procedures used by the company in selecting the Ingres DBMS. "By examining the systems on the market today, we found Ingres to be the best commercial DBMS for our particular application. Our selection process involved a thorough review of available [Digital Equipment Corp.] VAX-compatible DBMS."

The impetus giving rise to Comptek's use of Ingres was a U.S. Navy contract requirement. Comptek was asked to study the feasibility of hosting large software configuration data bases on DEC VAX-11/780 systems supported by commercially available DBMS. Comptek instituted a three-phase approach to the study and selection of acceptable DBMS.

Phase I of the study, which consisted of defining the data base requirements and resources, indicated that disk space, CPU availability and other computer resources available on the VAX-11/780 would be adequate to meet the defined requirements in rehosting the established data bases and absorbing projected increases.

Phase II of Comptek's study involved the selection of

candidate relational and Codd-syl-designed DBMS, which were VAX-compatible.

Selected Candidates

The selected candidates were Ingres, Relational Software, Inc.'s Oracle, International Data Base Systems, Inc.'s Seed, Software AG's

Adabas-M, Henco, Inc.'s Info and DEC's Datatrieve. Evaluation criteria were then developed and standardized.

The vendor of each candidate DBMS was invited to Comptek to demonstrate its particular system. This afforded Comptek's evaluation team and future DBMS users the opportunity to explore

the capabilities and limitations of each DBMS carefully.

In addition to the information gleaned through the demonstrations, Comptek gathered reports from current users of the products, which produced valuable observations and information based on actual experience.

After all data had been assembled, the evaluation process of Phase II began. Based on careful weighing of established criteria, Ingres was judged as first choice, with Oracle as second choice and Seed as third. The remaining DBMS candidates were scattered further down the eval-

(Continued on SR/48)

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Real Benefits of Data Base Technology

By Myles E. Walsh

Special to CW†

Data base management systems (DBMS) products come in a number of different shapes and sizes. Some are integrated with a data communications monitor, others have an integrated data dictionary, some are flexible and lend themselves to adjustments, and still others are rather rigid or of the "what you see is what you get" type.

Installation and support requirements vary depending on the capabilities and facilities contained in the product.

Nearly all contemporary DBMS make use of a data communications monitor and are frequently referred to as DB/DC systems. The data communications monitor adds the function of interactive, on-line information processing to a data base environment. Operationally, additional enhancements such as data communications monitors and data dictionaries provide better service to users, but they also require additional support.

DB/DC systems and data dictionaries, like all other software products, are delivered to an installation on a reel of magnetic tape. A series of manuals on the DB/DC product's use and support generally accompany the tape. DB/DC products vary significantly in terms of complexity, flexibility and capability.

When a DB/DC product is installed for the first time, computer resources are required to contain one copy of the system. However, when a DB/DC is in use, a duplicate set of resources is needed to perform a system definition for a new version or release. This commitment of resources becomes even more pronounced when a separate copy of a DB/DC system is needed for a test and development facility. Netting it all out, then, there is a distinct possibility that resource requirements in terms of equipment may be three times more than original estimates.

True Benefits

The true benefits of data base technology are realized in an on-line environment, where the processing of transactions carrying user queries and updates can take place interactively. And yet, from an operational perspective, another degree of complexity is added. Data communications networking is another technology which is at least as complex as, if not more than, data base technology. Whether a data communications monitor is integrated with or merely used by a DBMS, another specialization and another type of technician become involved. This can be a factor to be reckoned with when problem solving is necessary.

Just as a DBMS is often partially integrated with and uses the facilities of an operating system, the same is true for a data communications monitor. Therefore, when a problem occurs, it may take a coordinated effort by technicians in four interrelated areas merely to localize and identify the cause of the problem.

The more comprehensive DB/DC

Data base/data communications processing can provide reduced redundancy, data independence and increased productivity. However, there is a price to be paid.

This article describes what Walsh considers "a realistic approach to DB/DC technology," which he believes can help DP managers realize its benefits.

products include programs and modules that perform recovery, restart, logging and backout repair and restoration tasks. The users and technicians are responsible for preparing the procedures to be followed by the

system in carrying out these tasks. Those DB/DC products that are less comprehensive have a subset of the programs and modules necessary to perform the tasks. The users and technicians are responsible for de-

veloping the others, as well as the necessary procedures.

From an operational viewpoint, it is advisable to automate the recovery and restart process as much as possible.

Large data base reorganizations should be scheduled on weekends, because the competition for resources that would occur during the fast-paced Monday-Friday time period precludes performing long-running data base reorganizations during the week.

A data base reorganization is essentially a two-step process, involving first unloading the data and then re-



Garnered in an On-Line Environment

loading it in a manner that attempts to achieve a balance between efficient use of storage space and ready access to the data.

In most DB/DC environments, there are several other products that are installed to improve or enhance the overall performance of the DB/DC product. For example, a data dictionary is a product that can facilitate the task of documenting conventional as well as data base applications.

Operational Benefits

The operational benefits of some data dictionary products lie in their ability to create some of the struc-

tures (data base descriptions) used by DB/DC systems as well as by the applications programs. From an operational point of view, the practice of storing data base descriptions and file, record and field definitions in a data dictionary reduces the possibility of clerical error since common definitions are stored in, and consequently emanate from, a single source.

While these data dictionaries and DB/DC monitors and other related products are useful, they also require both equipment and technical support resources.

In terms of operator support, there

is something of a paradoxical condition that is almost forced upon users of DB/DC communications products. As every attempt is made to make the operating environment "automatic," the degree of complexity is increased for those situations in which the "automatic" procedures prove inadequate. Such situations require the response of a quick-reacting, skilled operator.

However, no matter how skilled the operations staff and no matter how foolproof the "automatic" procedure, errors invariably occur. The comprehensive DB/DC products are equipped with utility programs that

can completely recover damaged data bases to the point where the damage was discovered. To insure that damage does not go undetected, there are procedures that can be developed and programs that can be written to periodically produce control information ascertaining the integrity of data bases.

Glossy promotional brochures and slick, multicolored slide presentations describe DB/DC systems in terms of their potential. The advantages of data base technology — namely reduced redundancy, data independence and increased programmer productivity — are all highlighted, but there is little or no attention given to the trade-offs that must be made, nor to the difficulties of converting from a conventional environment to a data base environment.

Suggestions Offered

To remedy this situation, a few suggestions are offered. First of all, examine data base technology in terms of its advantages and the corresponding trade-offs. The first advantage — the ability to reduce data redundancy — is worthwhile, but it results in an increase in processing complexity. Storing, retrieving, backing up and recovering a data base in which there are relationships among data elements that transcend file boundaries is more complicated than doing the same things with conventional records and files.

The second advantage, data independence, reduces the complexity of applications programming, introduces a degree of data security and makes for more efficient applications programs. At the same time, however, it creates the need for skilled file and data base designers and administrators and data administrators. The work has not been eliminated; it has just been moved.

Furthermore, with the comprehensive DB/DC systems, systems programmers are required to support the product. The fact is the number of systems programmers would usually increase in an installation that installs a DB/DC product.

An in-house education and training program can help overcome the gap in understanding caused by indiscriminate use of terminology.

Walsh is director of data library development for CBS Records, a division of CBS, Inc. in New York City.

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Military Systems Aided by Relational DBMS

(Continued from SR/45)
uation scale.

Having recognized the initial features, which seemed to point to Ingres as the DBMS best-suited to anticipated requirements, Comptek focused on performance as the major concern in the Phase III evaluation. In Phase III, Comptek designed

'From Comptek's phased evaluation experience, significant problems surfaced that could serve to guide others in planning similar studies. The major problem involved establishing a design suited to user requirements.'

a benchmark using Ingres and Seed to compare the performance of relational and Codasyl-designed DBMS. The benchmark was conducted over a three-month

period. A conceptual data base, essentially independent of either candidate system, was developed similar to the one to be implemented.

This process resulted in Comptek's awareness of design features that were necessary product requirements. Training was then ar-

ranged for those who would actually carry out the benchmark in each system.

The previously designed conceptual data base was translated into both DBMS. Ingres was functional within a week; Seed required at least three weeks to become functional and then had some limitations that remained unaddressed, according to Comtek.

Relational Beats Codasyl

During Phase III, emphasis was placed on interactive update, report generation and interactive query. Similar coding was developed and implemented in the evaluation of each DBMS; at the same time, techniques had to be developed to gather timing information. Even though the ensuing data gathering process was tedious, the results were worthwhile in that they indicated that the relational DBMS was superior to the Codasyl DBMS in performance.

From Comptek's phased evaluation experience, significant problems surfaced that could serve to guide others in planning similar studies. The major problem involved establishing a design suited to user requirements.

A DBMS must have ample provision for data independence since the data design will necessarily change many times. Significant problems also involved gathering data and converting it into suitable format for the data base input so that output data could be verified, modified or reloaded.

Additionally, problems were encountered in establishing an operator interface that was simple and straightforward, yet encompassed all actions taken on the data residing in the data base.

The total evaluation process implemented by Comptek resulted in the selection of Ingres as the most suitable DBMS available for the company's applications. The primary feature of Ingres that gave it top placement in the list of candidate DBMS was its adaptability to design and structural changes.

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A screen oriented editor to create, delete, and update your data files.

Program Interface

Allows you to access the data base through high level language programs.

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Application Packs

To assist the user several application packages will soon be available for use with the RL-1 system.

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Installing DBMS Not Enough Methodology Key to Applications Integration

By Daniel S. Appleton
And D.S. Coleman

Special to CW†

If you want to achieve integrated applications that share common data resources, you must do more than simply install a data base management system (DBMS).

Some of the things you need to do are the following:

- Build a data-driven information resources management (IRM) plan — which views data as a resource "pool," not a resource "flow."

- Purchase the right mix of data management tools that optimize data independence, nonredundancy, integrity, accessibility, shareability, security, performance and data administration.

- Reorganize your department to include data base, input and output administration.

- Completely overhaul the methods you use to design, develop, implement and maintain end-user software.

While you can increase the odds in favor of failing if you neglect any one of these areas, you can ensure failure by neglecting the last one. All the planning, organizing

and new technologies will go for naught in transitioning from an insular to an integrated IRM environment if you don't install data-driven systems development "methodware" (see box).

However, regardless of how data-driven everything else is, if the systems development methodology (SDM) is application-driven, so will its output. On the positive side, if your SDM is data-driven, it will force you to a transition into a data management world, and it will synchronize your people, so enabling technologies and plans.

Applications Rut

The reason we don't hear much about data-driven systems development methodologies is that most DP people are stuck in the applications rut. The only way they can visualize information is in terms of "systems of information." Data base people have another view of information. That view is based on what they call "entities."

An entity is a representation of the knowledge we have about a physical or conceptual object or event. Entities

Issues such as planning, technologies and organization are critical to the success profile of a DBMS installation. However, they are not as important as the systems development methodology (SDM), according to Appleton and Coleman. In this article, they explain that "if you do not upgrade your SDM to accommodate DBMS technology, you will not be able to take full advantage of it."

are grouped together into classes or sets, by virtue of the fact that they have the same types of characteristics (attributes). Entity sets are interrelated; these set relationships define specific relationships that can exist among individual entities in the sets.

Entities and attributes describe the things of interest to a business at a given point in time. They make up the business knowledge structure. The data occurrences stored in that structure constitutes the business data base.

Entities are important quantifiers of information for many reasons. First of all, they are easily understood by users. Also, we can classify entities based on what their role is in the business. Shared entities are used by

many people; private entities are used by only one person. Shared entities have been standardized, while private entities come and go based on the needs of individuals. Also, shared entities integrate systems that use them.

The data life cycle is a critical IRM concept that can be derived from this shared/private entity classification. Shared data is private data that has been standardized and made available for common usage. Thus, the "company data base," being composed solely of shared data, is modified year after year by the conversion of private data.

The data life cycle is the motivating force behind the phenomenon we call data base evolution. As private entities are converted into shared entities, the company

data base matures, evolving in a manner that actually mirrors the company's evolution.

Data-Driven Objectives

The objectives of a data-driven SDM are to:

- Drive sets of entities out into the open, distinguishing between shared and private entity sets.

- Articulate these entity sets in terms of their attributes and relationships.

- Transform them into the physical structure of a DBMS data definition language.

- Build transactions that update the data base (using primarily procedural programming languages).

- Provide access to data stored there (using primarily user-friendly programming languages).

- Monitor the efficiency of the data base and its transaction set.

To accomplish these objectives, what you must do is change your existing system development methodology into a data-driven form. This should be done before you make a final determination about your DBMS software, organizational strategy and planning philosophies.

The first objective of your data-driven SDM is to drive sets of entities out into the open. To accomplish this, your data base administration people must employ a special data design methodology.

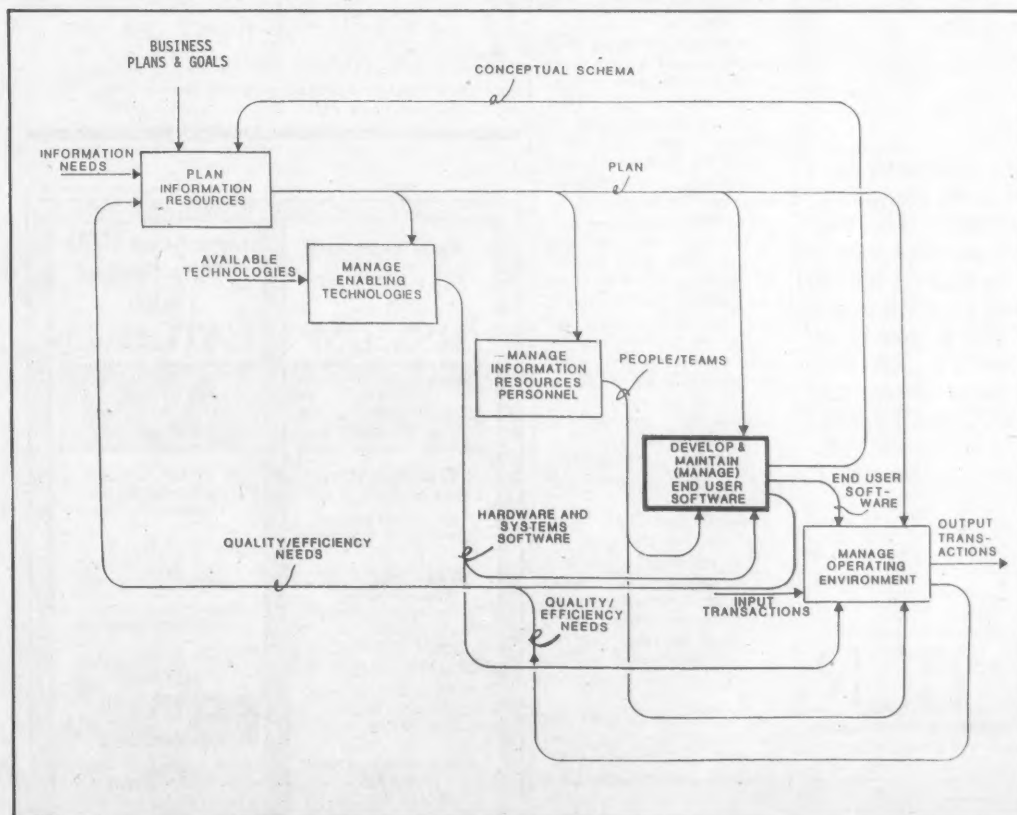
Neutral Data Structure

The data-driven SDM uses the neutral data structure to define and manage the entity-based conceptual schema. The data base administrator stores the conceptual schema in a data dictionary and uses it to keep track of all data regardless of its physical (DBMS) or logical (user view) form. Because the conceptual schema is neutral, it represents the most stable view of information available.

The second objective of the data-driven SDM is to articulate entity sets in terms of their attributes and relationships. This objective is partially accomplished by the data design methodology, through a process that is usually called "user-view synthesis."

However, that procedure must be augmented by heuristic analysis techniques, such as prototyping, which provide a data validation concept based on user-controlled empirical analysis.

(Continued on SR/50)



Managing Information Resources

D. Appleton Co. Chart

DBMS Not Always Enough When Integrating Applications

(Continued from SR/49)

Heuristic analysis also flushes out the critical information needed to optimize the structure of the physical data base, because it exposes "real" access parameters and keys and volumes and frequencies, based on empirical evidence.

Once the logical data base has been validated, it must be transformed into its physical form on the DBMS. The data-driven SDM must pro-

'The SDM must provide the ability to not only monitor efficiency, but to affect it. This means that data and transaction performance parameters must be understood and monitored by the SDM.'

vide for recording the physical transforms in the data

dictionary, along with the neutral form of the conceptual schema.

Having constructed the logical and physical data base forms, the data-driven SDM must next turn to the data acquisition problem.

Data base update transactions are responsible for maintaining integrity in the physical data bases; managing redundancy; enforcing triggers and assertions; providing for data base checkpointing, backup and recovery; managing commitment logic; editing and auditing data base contents; enforcing update security; and logging transactions.

The end product of the preceding steps can be characterized as "a pool of accurate and timely data which can be easily and economically drawn upon — to satisfy the decision-making requirements of an information-dependent worker."

Accessibility

The first three data-driven SDM objectives are targeted at creating such an information pool. The fourth objective is focused on the issue of accessibility.

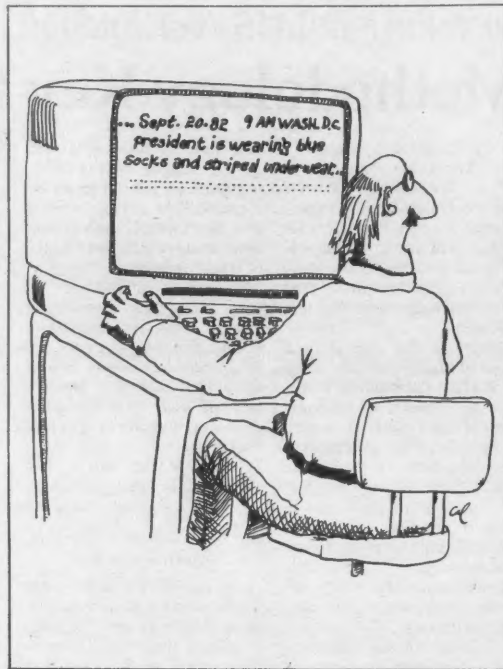
In the DBMS world, the most flexible aspect must be the retrieval transactions. They must allow many parameters against a large number of data elements to maximize user flexibility. Thus, these transactions must be designed last, and they should be built using non-procedural, user-friendly programming languages.

The final issue facing a data-driven SDM is efficiency. The SDM must provide the ability to not only monitor efficiency, but to affect it. This means that data and transaction performance parameters must be understood and monitored by the SDM.

Efficiency is monitored by performance measurement tools at the operating system level, the teleprocessing monitor level and the DBMS level.

Physical data base structures may be changed, update or retrieval transactions may be modified, or facilities such as multithread and multiuser may be invoked. All of this must be controlled by the environmental tuning features of the data-driven SDM.

Appleton and Coleman are president and vice-president, respectively, of D. Appleton Co., Inc., a Manhattan Beach, Calif. firm involved in the automation and integration of manufacturing systems.



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Two Options: 4GL vs. DBMS

Productivity Tools Must Match System Needs

By Jane Currey
Special to CW†

Productivity tools must be evaluated in terms of the systems they will be used to develop. Therefore, when a management information systems (MIS) organization looks for a way to achieve a significant improvement in programmer productivity, the first step is to examine the types of systems to be developed. These generally fall into one of the three categories described below.

The traditional applications system is developed by the MIS group as a controlled production system with a carefully designed data base, thorough data validation, controls for security and backup/recovery, preformatted reports and inquiries and extensive system documentation, including user instructions. All of these features are necessary in major production systems like payroll, general ledger and inventory control, especially when systems must communicate with one another. This kind of system will be referred to as a "type A" system.

There are, however, many user requirements that call for a programmed solution but which do not need all of the controls of a type A system. One such category, which will be referred to as "type B," is the need for easy access to a controlled (type A) data base with the ability to extract information for reports or independent manipulation, or answer "what if"-type questions. In the past, this type of requirement has been only handled when it was defined as part of a type A system.

Third Category

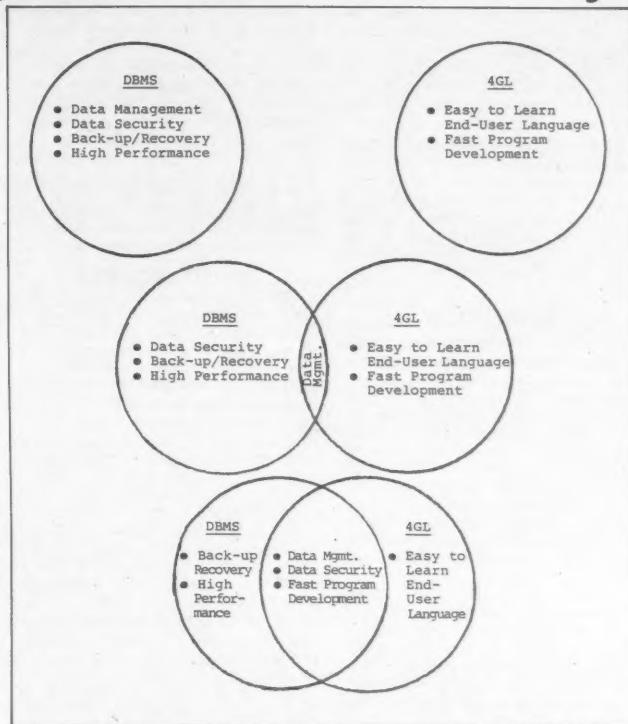
The third category of user requirements is the need for a small system to solve a problem within a single-user group, with no need for extensive controls or interfaces with other systems. An example of this type, referred to as "type C," might be a facilities reporting system, consisting of a file of the information necessary to generate reports on utilities usage vs. square footage, usage trends and so forth.

Up to now, type C requirements have either been handled manually or implemented by the users themselves, using a friendly monitor such as VM/CMS. The VM/CMS approach has been very useful, but is not without its problems. There are limitations to what can be done without programmer training, and it is sometimes used to create a type C system when a more controlled type A development was called for.

To summarize, type A systems have MIS-controlled data base and outputs. Type B systems access an MIS-controlled (type A) data base and produce end-user controlled outputs. Type C systems have end-user controlled data base and outputs.

Most of the typical MIS backlog is comprised of type A systems, but much of the "hidden" backlog that is referred to so frequently is made up of type B and C systems.

The software marketplace has seen



The Trend for the DBMS and the 4GL to Overlap Each Other's Functions

the growing demand for tools to shorten development time and has responded with two basic alternatives that address the entire development process — not just a single aspect such as report generation.

The first of these alternatives comes as part of a full production-oriented data base management system (DBMS). The core of most of the major DBMS packages offer data management, data security and backup/recovery facilities. While these may have an indirect effect on programmer productivity, it is the optional features offered with the DBMS that are specifically directed toward improving programmer productivity and reducing applications development time. These are most often packaged in the following modules:

- Report writer — usually a free-form, parameter-driven language processor that simplifies the preparation of batch reports.
- On-line query language — typically an English-like language with moderate syntax requirements, used both by programmers and end users to obtain on-line answers to ad hoc questions.
- Application development aid — a recent or pending offering of the major DBMS that provides a high-level, Cobol-like language and on-line structured development environment, including screen design, intended to reduce the coding requirements for on-line systems.

These features normally only operate within the framework of the complete DBMS (except for the report writer) and are used primarily for type A systems development.

The other alternative is a fourth-generation language (4GL), also referred to as a nonprocedural language or end-user DBMS. Fourth-generation languages are very high-level languages used by both DP professionals and end users to create, maintain and query/report on a specially defined data base (and to query/report on almost any format existing data base). The primary characteristic is their simplicity or user-friendliness.

They offer limited data base management facilities, although there is a trend among the vendors to enhance this aspect of the product. They reportedly reduce program development time by 50% to 80% by providing high-level verbs to handle much of the file-matching logic, data validation and update, output formatting and error handling and also by enabling the use of fast prototyping during the design stage.

4GLs were originally used primarily for type B and C systems but, as their capabilities are expanded, are now being used for some type A systems as well.

Major Differences

Although the two product categories described above have traditionally addressed different markets, the functional boundary between them is recently becoming less distinct as each adds capabilities intended to make the product more competitive in the other market (see chart). However, because of their disparate origins, they continue to have some major differences.

- Backup and Recovery. The full

DBMS offers extensive built-in routines for recovery from system failures, with such features as optional automatic restart of interrupted transactions. The 4GL, on the other hand, offers simple commands to create and load backup files and to create transaction logs, but these commands must be deliberately invoked by the user/programmer.

- High-Volume Performance. The full DBMS was designed to handle high-volume situations (that is, huge data bases with hundreds of users and thousands of daily transactions). The 4GL vendors readily admit that their products are not suitable for the type of volumes one might see in an airline reservation system, but claim that "moderate" volumes are no problem. No one, however, is defining any cutoff points.

- Ease of Use. The 4GL is very easy to learn and to use. Most were designed for use by end users and have retained a simple syntax, even as new programmer-oriented functions are added. The full DBMS on the other hand was designed for use by DP professionals with specialized training, sometimes requiring the assistance of a data base administrator.

- Price. A 4GL with all desired options will have a list price of \$100,000 to \$150,000, while a full DBMS will list at \$200,000 to \$250,000K.

Three Separate Languages

One important aspect of this ease of use is the fact that the 4GL has a single language for programming, on-line query and batch reporting, whereas the DBMS often uses three separate languages.

It is obvious that some type A systems will require the full DBMS approach — that is, when there is a very high transaction volume, many concurrent users and sophisticated backup/recovery requirements. It is equally obvious that type C systems will be most productively developed with a 4GL. Therefore, large MIS organizations developing systems on both ends of the spectrum would benefit from having both a major DBMS and a 4GL.

The decision is more challenging for the small-to-medium size organizations that are not concerned with high-performance/huge-volume applications. The recommendation made here is that when the boundaries of a 4GL appear acceptable, the 4GL is the preferred solution for the following reasons:

- The 4GL generally costs less than a full DBMS.

- The 4GL is easier to implement with less training and less start-up time.

- The 4GL usually does not require additional support personnel (For instance, a data base administrator or system programmer).

- The 4GL offers productivity benefits for all three types of systems, while a DBMS addresses only type A and some type B systems.

Currey is manager of systems development at National Advanced Systems, Inc. in San Diego, Calif.

DBMS Hoax?

DEC-computer sites purchase bogus relational system.

Fortune-500 companies did it. So did prestigious universities, banks, newspapers, a large computer manufacturer, and many others. All of them bought a software package that they believed was a relational DBMS. Why this happened is a lesson in the history and perception of relational systems.

IBM AGAIN

Relational systems were conceived in 1970 by E. F. Codd, an IBM research scientist. The advantages of data management software had been known for years. But Codd invented a concept of looking at data and information in a simple but powerful way.

Codd discovered that all data could be organized into tables, or flat files, in a normalized form. He called these tables relations. Around this framework, he invented an easy-to-use language to manipulate and extract data from relations. Codd's conceptual breakthrough accommodated all data structures that conventional DBMS's did. And he discovered that inexperienced people could understand his concepts as easily as software experts.

THE FLAW

Codd's scheme required an operation called JOIN. This facility dynamically merged related data items from several tables into one logical table whose characteristics were identical to those of a physical table. But here he encountered a major problem.

The JOIN operation was impossible to implement efficiently with then-current software methods. An efficient, run-time JOIN required special hardware called a content-addressable memory. Such hardware would take years to develop. In fact, commercially-available content-addressable memory still does not exist.

In 1971, our company, Software House, began developing a relational DBMS for large DEC computers. We believed that our System 1022 DBMS would overcome hardware constraints with clever software techniques. It was a bold gamble.

After five years of development, Software House had failed. At that time, System 1022 had many relational features. According to Codd's definitions, however, System 1022 was not relational. Nevertheless, our president believed that System 1022's few relational flaws would be masked by its many relational features. He decided to market it.

NO JOIN OPERATOR

For interactive users, System 1022 provides a flexible and easy-to-use language for on-line data-base queries and updates. Boolean queries with multi-key and partial-key searches happen in seconds, regardless of data-base size or query complexity. The secret is System 1022's proprietary, inverted-file indexing and access method. And during data base updates, System 1022 automatically and efficiently maintains its data-base indexes in optimal form, without degrading subsequent retrieval speed. So you don't have to periodically rebuild your data-base indexes or spool your data-base updates—major flaws in other DBMS's.

System 1022's access method takes the place of content-addressable memory. It may not be as fast as the hardware, but when you see it in operation you'll agree that it's more than fast enough. However, no explicit JOIN operation exists. Instead, a powerful MAP command quickly retrieves related information from various tables. But more on that later.

NO PASCAL

With System 1022's Host Language Interface, you can produce tailored data base

application environments in COBOL, FORTRAN, MACRO, and BASIC. So you can exploit operating-system features like command scanning, IPCF, and DECNET in your applications. You can even write your own interfaces to other software packages and other host languages.

System 1022's Host Language Interface was not designed as an afterthought. All of the features of System 1022's interactive environment are also available in the Host Language Interface. For example, a simple subroutine call invokes the 1022 Report Writer and then returns to the host-language program at its next statement.

RECURSION

Some DBMS's support only sequential or two-level hierarchical data structures. This severely limits the variety and sophistication of your applications. A comprehensive data base system does more.

System 1022 supports full hierarchical, network, and recursive data structures, for virtually any application. Its relational approach combined with this inverted-file access method offers high performance, high reliability, and data integrity. System 1022 handles a complicated bill-of-materials application as easily and efficiently as a simple mailing list application.

System 1022 also gives you both data independence and structure independence. As your requirements evolve and change, you can add new fields, new record types, and new relationships to your data base, and not have to recompile or relink your programs that access the data base. But that's not all.

With System 1022's efficient MAP facility, you can navigate your data structures from the interactive environment as easily as from your host-language programs. Of course, in both environments, you can access and update several record types and several data bases at once, even from many processes simultaneously.

APPLICATION PROBLEMS

System 1022 is more than just a DBMS. There's a report writer with pretotaling, text scrolling, context independence, and unlimited control breaks; audit trail journals for restart and recovery; field-level security based on user ID, class, and passwords; direct access to your existing COBOL files; utilities to load your data base, add fields, extract subsets, perform complex statistical analysis, post transactions; and much more.

For most jobs, you don't even need to write a program—System 1022 already provides the utilities. And you can easily teach your users to do their own development, reporting, and data maintenance. So you can centralize or distribute your information management as much as your needs require.

UNUSUAL QUALITY CONTROL AND SERVICE

The other side of software features is software service. Unlike other software companies, we take software bugs for what they really are—software mistakes. And we've spent man-years developing proprietary, automated software testing tools to eliminate such mistakes. We put each version of System 1022 through a comprehensive, 15-hour computerized check-out on our in-house computer. Only after it passes this checkout with a perfect score is it released to our field-test sites. And only after a successful field-test is System 1022 released to you. System 1022's reliability is well above the industry average.

Despite our best efforts, some mistakes elude us, so we take them seriously if you

discover them. We realized long ago that a System 1022 software mistake can shut down a critical application in your shop, costing you both money and angry users. If you discover and report a critical mistake that we've made, our maintenance and support staff promptly investigates it for you. Then they provide you a way to conveniently get around the mistake or they correct it for you with a patch on your own computer.

In addition, you don't have to send us a mistake-report form. Our support and maintenance staff is as close to you as your telephone and your computer.

PROFIT MOTIVES

DBMS software is not cheap. You can pay from \$5,000 to over \$100,000 and buy a wide range of capability and functionality, so careful shopping is necessary. System 1022, with all its separately-priced modules, costs only \$65,000—and substantially less for the smaller DEC-2020 computer. For this price, you receive a perpetual license with one year of our maintenance and update service. Convenient lease and rental terms are available, as well as generous discounts for tax-exempt institutions.

Our price is only a fraction of what it costs us to develop and enhance System 1022. And it's only a fraction of what it would cost you to develop and support comparable software yourself.

But best of all, you can make a profit from System 1022. You might do what the time-sharing director of a large insurance company did. With System 1022, he increased his staff's efficiency by "5 to 10 times over conventional methods of application development." Or the head of the management consulting division of an engineering company. His division "can now handle far more projects with fewer people." Or because of System 1022, you might not need to hire two more good programmers—or one more bad one—this year.

Each of our customers—large and small—has a unique System 1022 profitability to tell. One of them is probably in a computing environment just like yours.

STANDARDS

System 1022 is now the information management standard for large DEC computers. Hundreds of organizations—in the U.S. and around the world—use it on DECsystem-10 and DECSYSTEM-20 computers. No other DEC-10/20 DBMS is as widely used as System 1022.

Naturally, such a large user base gives you many benefits. It ensures that we'll be around to support and enhance System 1022 long after DEC discontinues its 36-bit computer line. And it provides plenty of System 1022 application ideas and experience for you to tap, either through our user newsletter *The Audit Trail* or by direct contact with users at our annual Users Conferences. In addition, other software vendors now interface their products to System 1022. This gives you a variety of complementary and compatible software to choose from as your needs grow.

PRESIDENT ALSO INVOLVED

Our president is an honest man. When he decided to market System 1022 back in 1976, he knew it was not a relational DBMS. So he told his salesmen not to call it relational.

Despite our relational disclaimers over the years, our users have discovered that System 1022 effectively helps them manage their information. They use and rely on its many relational features so much that they believe System 1022 is a rela-

tional DBMS, even though it strictly isn't.

Our president and his salesmen are still honest. Furthermore, they all have years of hands-on experience with systems programming and application development, so they don't have to confuse you with sales jargon or high-pressure sales techniques. You should feel free to call on them for help. After all, as any programmer will confirm, it's almost impossible for one programmer to tell a lie to another and get away with it.

THE ULTIMATE PROOF

The best proof of System 1022's value to you is how it works at your own site, with your own information and users. That's why we offer you a free 60-day trial and on-site technical seminar.

During the free seminar, you learn about the System 1022 features that we don't have the space to discuss here. You can ask some tough questions and receive knowledgeable, accurate answers.

During your free trial period, you can verify how easy System 1022 is to install. Read our clear, literate documentation and test our hot-line support service. Compare and benchmark System 1022 against other systems—relational or not—that cost half as much or twice as much. Take some of your largest data files and let System 1022 prove how quickly and easily you can build applications around them. And watch your programmers—and your end-users—learn to use System 1022 productively in a matter of hours, without having to attend special training classes. You'll be very pleasantly surprised.

If you have a DEC-20 or DEC-10 computer, we urge you to call Lynda Jones at the number below to arrange your free trial and on-site seminar. Call your DEC salesman, too. If he doesn't already know about System 1022, he should.

Some of you may think that our claims and our offer sound too good to be true. Or you are already using other software that you bought or developed without investigating System 1022 in depth. Some of our customers have been in exactly those predicaments, but they called us and now have some of the most successful computer shops around.

So don't delay. Enjoy the productivity improvement and user satisfaction that System 1022 provides. Give us a call today with no obligation.

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A Unique Challenge Parameters Help Optimize Data Base Design

By Phillip G. Elam
and Larry L. Best
Special to CW†

Since one of the major objectives in acquiring data base technology is the optimization of finite computing resources, data base designers face a unique challenge. There are several parameters through which data base design can be optimized. Depending on the specific goals of the designer, it may be appropriate to emphasize one area at the expense of others.

Usually, each parameter of system optimization should be considered in order to plan for and evaluate the various trade-offs. Typically, the basic criteria by which data base design can be optimized include: data base development time, execution time, data storage, level of user expectation and data flexibility.

Optimizing data base development time entails making the system as simple to code and construct in as short a time as possible. More often than not, it means that the actual time expended in design data structures and relationships that support the system is kept to a minimum. The less time spent on data and program design, the more time that will be available for other components of the data base design process. This is a risky approach and should be initiated only when management is totally committed to the minimization of development time and is willing to assume full responsibility for the level of risk being taken.

Over-Optimization

Inevitably, over-optimization of development time results in disaster once the system approaches implementation. Time after time, disaster occurs because the proper focus on data and program design has been done haphazardly and the result is that the system must be continually modified and reprogrammed.

Over-optimization of data base development is often a temptation because there are usually enough options within most commercial data base packages to accommodate almost any design, regardless of how inflexible or inefficient the design may be.

Unfortunately, the pitfalls of over-optimization may not be obvious until well into the life of the project, until testing or implementation of the system points out serious flaws, which by then are expensive to correct. Flaws typically occur in system performance, inflexible data structures or in unnecessarily complicated processing procedures.

Optimizing execution time in a data base system is usually, but not always, associated with an interactive system. Under certain conditions in a batch operating mode, it is important to optimize the total amount of time necessary for running the system. In interactive modes, optimization of response time is normally associated with transactions that retrieve or transactions that update the data base.

Optimizing execution time requires a carefully designed and, normally, complex set of programs, as well as a carefully planned set of data structures. A finely tuned system is sensitive to change and, as such, is subject to numerous variables that affect performance. A well-tuned system requires regular and frequent monitoring. Whenever major changes in the system's profile occur, extreme care must be taken to maintain the desired level of performance. As a general rule, a change to a well-tuned data base system will adversely affect performance.

Tuning Batch Applications

In those environments where both batch and interactive data base applications are operated simultaneously, designers usually find that the batch system will negatively affect performance of the interactive system. It is, therefore, important to give as much attention to fine-tuning the batch application as the interactive network to avoid this type of processing bottleneck.

Optimizing the space required by data within the data base is a valid practice. However, because it is inexpensive in relation to other resources in the computing environment, storage considerations are usually not as important as other criteria during the design phase. There are systems large enough to warrant more than a cursory analysis of their physical storage requirements in the design phase. Designers normally find that techniques intended to save space invariably trade those savings for increased CPU utilization. As a general rule, the more complex the data compaction algorithm, the more the CPU will be used.

Storage optimization normally involves creating sophisticated data structures (either by the data base package or the programmer) and, in so doing, introduces an additional level of programming complexity. Future changes to the data base are subject to these inherent complexities. For data to be optimized to use storage efficiently, the structure of the data should be static in nature, that is, the rate of environmental change should be relatively low. Whenever the basic data structure changes, modification can normally be achieved efficiently only by personnel familiar with the complexities of the system.

User Expectation Levels

The data base system, as viewed by the user, can be very elegant or rather simple. Elegance at the user level usually translates into complex processes and even more complex data structures. What users may view as a simple convenience may, in fact, translate into an operational and developmental monstrosity. A real danger exists in finalizing the list of user specifications and expectations prior to it being reviewed by the data base designer. Only the designer is qualified to alert management to any major technological difficulties.

'Ignoring any aspect of the design process produces the same effect as making bad data base system design decisions.'

A possible result of not permitting the designer to review the proposed system early enough in the design process could be the construction of a data base system that may not work properly or, in some extreme cases, not at all. Mistakes are usually not discovered until sometime late in the implementation phase.

DBMS represent a first step in achieving data independence, but they can only go so far. If the user's operating environment is subject to frequent change or has historically been unstable, it may well be advantageous to optimize the degree of data independence for a specific application area. Under this approach, future changes can be absorbed by the system with minimal impact on other operational areas. This will normally require extensive preimplementation planning that will negatively impact overall system development time.

Overoptimizing any aspect of a data base system at the expense of

others always involves a price as all other components of the system are likely to be negatively impacted. When initiated judiciously, however, optimization of system design parameters can produce an efficient and cost-effective data base system. If there is a particularly dangerous set of design parameters that should not be over-optimized, it is in the area of development time and the level of user expectations.

Automated Tools

With the introduction of literally hundreds of available program development tools and aids, many DP installations are inadvertently over-optimizing in the two critical areas just mentioned.

When problems and mistakes typically tend to surface is the first time modifications must be made to the data base system, and the true quality of the design becomes apparent.

Ignoring any aspect of the design process produces the same effect as making bad data base system design decisions. The effective data base designer needs to be aware of the available alternatives, the impact and cost of each and the overall effect of his or her decisions in all cases.

Elam is marketing manager and Best is group manager for C.A.C.I., Inc. of Plano, Texas.

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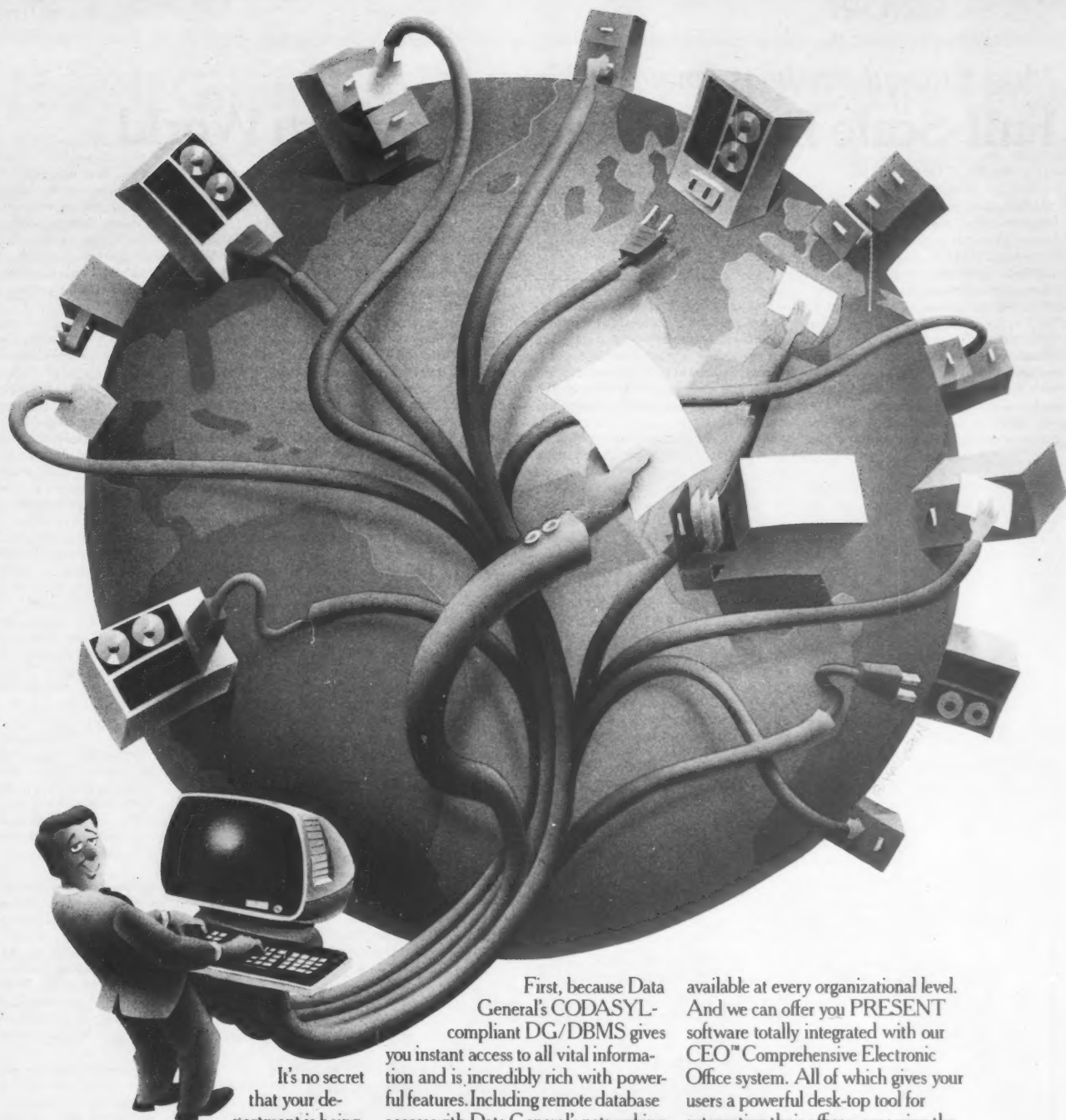


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Most Current Products Found Lacking Full-Scale DBMS Needed in Micro World

By Dr. C.W. Holsapple

Special to CW†

Although dozens of micro software vendors offer products loosely referred to as data base management systems (DBMS), these products actually bear little resemblance to mainframe and minicomputer DBMS.

Instead, they basically function as file handlers and do not offer the features normally expected of a good DBMS, such as data integration, non-redundancy, integrity guarantees, performance control mechanisms and extensive data security.

In view of the exploding demand for micro application software, the need for a full-scale DBMS in the micro world is clear.

However, the would-be implementor of a full-scale DBMS for micros is confronted with several problems peculiar to the micro environment. There is the technical problem of how to implement within the constraints of micro hardware.

Marketing Problems

There are also significant marketing problems. Presently, only an extremely small percentage of the micro world is skilled in the principles and techniques of data base management.

This limited market prevents an un-

'In view of the exploding demand for micro application software, the need for a full-scale DBMS in the micro world is clear.'

subsidized implementor from pricing micro DBMS software at the level of commonplace micro products such as operating systems and spreadsheets. Resultant revenues would not cover the development costs, much less ongoing maintenance and enhancements.

On the other hand, a micro DBMS cannot be priced at the level of a comparable mainframe DBMS, even though it delivers the same productivity gains as its mainframe counterpart. A complicating factor is the widespread attitude in the micro world that software prices should be a fraction of hardware prices.

A DP professional, experienced with mainframe DBMS, could be forgiven for concluding that workable DBMS do not exist in the micro world. A quick sampling of micro products purporting to be DBMS reveals an array of file handlers of varying quality and prices (\$50 to \$1,000). Furthermore, the technical and marketing obstacles for a viable

micro DBMS are severe. Nevertheless, mainframe DBMS capabilities are available today in the micro world.

In some respects, micro DBMS features actually surpass what is presently available for mainframe DBMS.

Extended Network Approach

The most extensive logical structuring capabilities existing in the micro world follow what is known as the extended network approach, which is not to be confused with the older relational, Codasyl network and hierarchical methods of data base management. While this newest approach to logical structuring does permit relational, hierarchical and Codasyl network structures, it is by no means limited to them. It offers much more power and flexibility in terms of representing logical relationships between data.

As with the older architectures, fields are grouped into record types (sometimes called entities, segment types or "relations"). However, unlike its predecessors, the extended network approach allows the *direct named* representation of all types of logical relationships between record types: one-to-one, one-to-many, many-to-many, recursive one-to-many, recursive many-to-many and so forth. This means that a micro applications developer can very conveniently and concisely handle complex, intricate real-world relationships without redundancy or contrived, artificial structuring.

The extended network structuring techniques have yet to be implemented for mainframes because of their relative newness and the strong vested interest in DBMS built around the old conventional architectures. In the mini world there is one DBMS based on the extended network approach. By contrast, this is clearly the dominant approach among the very few workable DBMS implementations that do exist in the 8-bit and 16-bit micro world.

The languages available for accessing a micro data base are at least comparable to those of mainframe DBMS. They are far more sophisticated than what is available with micro file handlers.

For building interactive application software and for routine, repetitive processing there is a data manipulation language (DML) that is able to process extended network schemas. This DML is quite different from Codasyl DML. Not only does it handle more advanced kinds of relationships, it also has relatively high-level commands that process entire groups of records at a time, in addition to record-at-a-time processing. The DML commands can be used interactively or from within a host programming language such as Pascal, C, PL/I, Cobol, Basic or Fortran.

For ad hoc retrieval from a micro data base, there is a high-level query language. The query language for extended network schemas is very similar in appearance to the relational sequential query language devel-

oped by IBM. The main difference is that it allows a query to be stated more concisely than the corresponding relational query. This is because relationships can be simply specified by name, rather than by a matching of repetitious fields. The query language also supports tabular end-user views.

In the micro world there exist performance control facilities comparable to those of mainframe DBMS. These are especially important for a micro DBMS in view of the relatively constrained hardware environment in which it must operate. These facilities include data compression, control over physical record placement, physical clustering of logically related records of different types, record access via address calculation and/or multilevel balanced indexes.

To be comparable to the usual mainframe DBMS, a micro DBMS should be able to support multiple concurrent access to a data base. This capability is currently available in the micro world. Both active and passive locking are provided down to the individual record-occurrence level. This kind of flexibility is not offered by some leading mainframe DBMS.

Sophisticated Security

Highly sophisticated security mechanisms are available to micro DBMS users. These include password protection as well as automatic data encryption (at the field level) and read/write access code protocols for protecting fields, records and relationships.

From the data integrity standpoint, many built-in integrity guarantees are available. There is automatic feasibility range checking for numeric, character, date and time data values. An automatic page-posting facility allows the developer to control exactly when a complex transaction is committed to the data base. Another integrity mechanism is automatic transaction logging.

To keep track internally of interrecord relationships, mainframe DBMS typically use chaining, or data redundancy in the case of DBMS that support only tabular logical structures. Because of the storage and processing demands of traditional mainframe implementation techniques, it is highly questionable whether they could be used to implement a viable DBMS for small micros. The implementation technique underlying extended network DBMS in the micro world is of special interest, because it does not involve chaining or redundancy. Instead, it uses a variation of B-tree techniques for handling interrecord relationships. The result is a much lower storage cost and faster processing.

In the micro world, the highest quality application software is and will be developed by skilled professionals using the most advanced DBMS tools.

Holsapple is associate professor of business administration at the University of Illinois (Champaign).

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Health Group Uses DBMS to Check Up on Data

WHITE PLAINS, N.Y. — The results of preventive health maintenance are reduced long-term medical costs and, more importantly, better long-term health for its subscribers. The practice of administering preventive health care, however, is an amorphous task — one that lends itself nicely to a data base management system (DBMS).

Health Examinetics here, which serves such clients as Conoco, Gulf Oil Corp., Du Pont, Atlantic Richfield Co. and Philadelphia Electric Co., is using a Data General Corp. Eclipse information system and data base management system, DG/DBMS, to cross-check, report and analyze data involved in comprehensive preventive health maintenance. This data is collected on tens of thousands of people each year.

The company also tests a variety of worker groups including carpenters, electricians and engineers. In 1981, Health Examinetics tested more than 55,000 people in 40 states.

Mobile Testing Units

Health Examinetics put mobile health testing units together in 1968. Hospitals on wheels were not a new idea; small vans outfitted as clinics and crisis/rescue vehicles existed in a number of cities. But these units were different both in nature and purpose.

Health Examinetics' Ed Berner explained: "We started out with large semitrailers — about 45-ft long, 13-ft high and 8-ft wide. We equipped them with everything from heating, air conditioning and carpeting to sophisticated biomedical instrumentation.

"We hired X-ray technicians, registered nurses, medical assistants and field maintenance technicians to staff the facilities. The result was a small fleet of mobile units — and later some fixed sites — capable of providing comprehensive physical examinations of comparable quality and breadth to that offered by a well-equipped hospital."

The company's mobile testing personnel perform hearing and vision tests, X-rays, electrocardiograms, blood tests, lab analyses and the routine height, weight and blood pressure exams. "We come right up to the work place and are able to test each person in under an hour with all the tests completed," Berner said.

The mobile units make it easier for everyone in a work place to have checkups quickly and easily. Health Examinetics not only looks at the data on each individual, but also does group studies and analyses to detect specific work place hazards and general trends.

"The first thing we look at is immediate potential problems for the individual," Berner explained. "We have several levels of alarm flags built in. If analysis turns up a life-threatening situation, the computer signals for an emergency phone call to be made to the individual's doctor. If a lower priority problem is detected, a special letter of notification is issued and mailed."

Normal procedure at Health Exa-

minetics is to generate a report on each tested individual for his personal physician. "Because of our data processing resources and the battery of tests we do, we can give the physician a fuller profile than would otherwise be called for," Berner noted. "Our software can also identify trends and flag them. For example, a person's cholesterol level may be increasing. Maybe it's still in the normal range — but three years of tests show a trend. Doesn't it make more sense to try and catch these things early, instead of after something goes wrong?"

Besides data on individuals, Health

Examinetics does comparisons and contrasts of groups of individuals within a work place using similar and dissimilar work place statistics.

Detecting Conditions

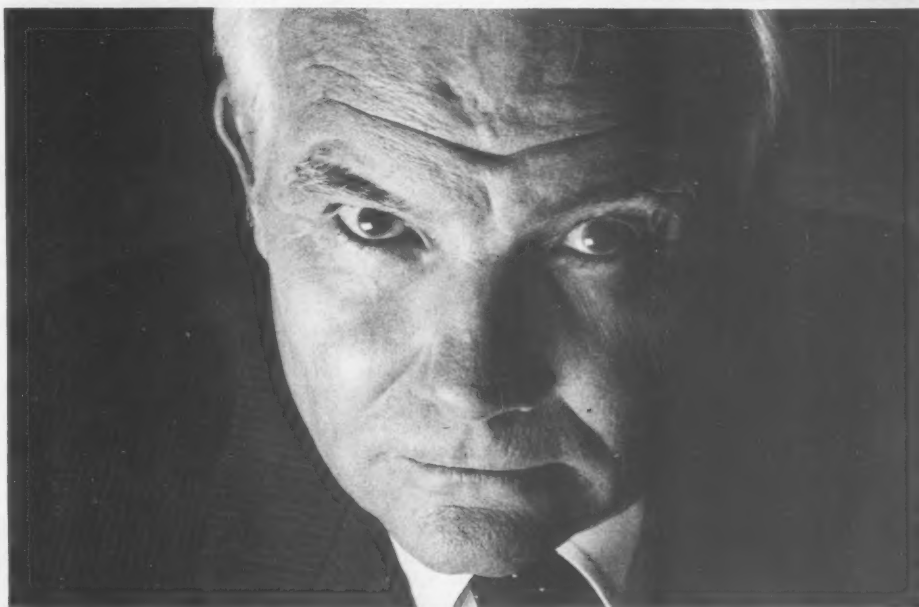
"We often help detect general conditions of a work place," Berner said. "When you've got the numbers, there's a lot you can check. We also do a lot of epidemiological work — medical statistics. It's all part of maintaining health for the individual and detecting potential work hazards."

All this testing generates a healthy amount of data. For each patient,

Health Examinetics may gather 50 to 500 items of information. In addition, the company maintains files and makes year-to-year comparisons on individuals' previous checkups.

The mobile and remote units are responsible for gathering data. Once gathered, the data is processed, stored and quality-controlled, and the reports and analyses are generated at Health Examinetics' White Plains headquarters.

To handle an expanding volume of incoming data and meet increasingly varied and complex assignments — while maintaining a high standard (Continued on SR/58)



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Health Group Uses DBMS to Cure Data Ills

(Continued from SR/57)
of quality control and cross-checking of the data — Health Examinetics upgraded its data processing facilities from a small Eclipse system to an Eclipse MV/8000 information system and Codasyl-compliant DG/DBMS from DG.
"We began on a Data Gen-

eral Eclipse S/200 computer," said Todd Kissam, manager of software development. "But our work volume has been growing at 30% to 40% a year. So we looked around for a stepup." Kissam said Health Examinetics wanted a 32-bit processor for the extra memory and speed.

The next criteria were software resources. "We had to have a data base management system," Kissam said. "DBMS was the only way we could take on new work with major changes in the data structures involved. The exceptions in our work were killing us. And we wanted the DBMS to be Codasyl-

standard for transportability and training purposes."

Minimal Training

Because DG's DG/DBMS is Codasyl-compliant, Kissam and other staff were able to understand the software based on what they learned in college courses and by enrolling in DG's data base

management course. So training has been minimal.

Health Examinetics had a good idea of how it wanted its data arranged. It chose a DBMS primarily for its flexibility — in both organizing data and creating new applications. For example, the firm performs a great deal of tests that provide normal or abnormal results. With the query facility of DG/DBMS, Health Examinetics can look at its information in a variety of ways.

It can examine how high or low abnormalities are, the predicted number of abnormalities and in which industries and sex they are most likely to occur. Also, the information can be presented in accordance with client requirements — alphabetical by patient name, those with abnormalities, elevated abnormalities — in list or graphics format.

The query facility provides Health Examinetics with a fast and easy way to access information from the data base without having to develop an application program or determine how to navigate DG/DBMS data structures.

In addition, Health Examinetics adheres to a number of government regulations. For example, it must record the serial number of equipment used to administer a test, the technician involved and when that technician was last tested for his ability to use that equipment. As regulations change, the ability to change, add, delete or tailor a report to certain specifications is important. The flexibility offered by DG/DBMS helps Health Examinetics save a lot of time because rewriting programs isn't necessary.

In the past, it took three to four days to code a special program for new requests or applications. Now, with its data base system, it can be done in 20 minutes. The query capability facilitates the programming so 30% to 40% of the firm's programs never have to be written — the query is used instead. Also, the use of DG's Present presentation facility permits the information to be prepared in graphics format.

The major benefit of DG/DBMS has been the increase in productivity. Health Examinetics' operations are now three times as productive with 20% less staff. With the normal attrition rates, Health Examinetics found it simply didn't have to replace people. The data base system saved time for programmers, clerical and other staff.

In the history of

DATA MANAGEMENT

the methods and machines used for handling data have varied from the bizarre to the epoch making. The Victorian secretary was once expected to create her letters by inking the raised letters on the 'Writing Glove'. Somewhat more advanced were the early typewriters which were slow and clumsy, but they provided the flexibility of keyboard operation, and were faster than handwriting.

It was not until the development of ENIAC that data truly began to be 'managed' in the modern sense, and it has been a remarkably short albeit difficult journey from ENIAC to the modern interactive computer.

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Needs More Emphasis

Training Critical to Implementation of DBMS

By Joseph E. Wehr Jr.
And Mark Gregoire
Special to CW†

Once a company has selected a data base management system (DBMS), there are many functions that may be performed in order to ensure the successful implementation of a DBMS-based environment. These functions include establishment of a data base administration function, development of DBMS standards and implementation of a training program.

While these functions are critical to the success of the DBMS implementation, significant (and sometimes excessive) time is often spent on the selection of the DBMS itself because of the pressure to install the DBMS and make it operational. Therefore, these functions do not receive the attention they deserve.

Although the above functions are all critical, the most important is the training of all personnel so that they can successfully perform their duties in the DBMS environment. Because of the desire to convert quickly or develop DBMS applications, the training is often inadequate. The importance and the extent of the training requirement is neither well understood nor successfully planned.

Traditional Methods

Traditional methods of DP training, such as audiovisual courses and courses developed and taught by an in-house training staff, are inadequate because of the specialized skills needs in a DBMS environment. Audiovisual courses fall short because the technical nature of the DBMS generates many questions that require the presence of an instructor to clarify details before progressing to other material. The use of an in-house instructor is also a problem be-

"Traditional methods of DP training, such as audiovisual courses and courses developed and taught by an in-house training staff, are inadequate because of the specialized skills needed in a DBMS environment."

cause those who are already DP instructors probably do not have the required background in the DBMS.

Successful DBMS training requires knowledge that can only be acquired through actual experience. Also, the wide range of DBMS training requirements is usually beyond the ability of one individual. While there are usually individuals with sufficient DBMS technical knowledge on the staff, they are often unable to teach or too valuable to be dedicated to educating others.

It has been Data Base Management, Inc.'s (DBMI) experience that the most viable solution to the training predicament is the hiring of a vendor to present a series of courses in the DBMS. There are many advantages to this approach. The vendor will be able to provide the required training on short notice. Their courses already exist and have benefited from being presented at many previous installations and, therefore, are more likely to provide successfully the required training than is a quickly developed in-house course. Also, vendors will have an adequate number of qualified instructors available to respond to whatever level of training is required.

There are four types of personnel who must receive DBMS training. They are management, technical

support, data base administration and applications personnel.

Training for management personnel should be directed to all levels of management who will be responsible for the migration and development of DBMS applications. It is important that these personnel have a conceptual understanding of the DBMS, its capabilities and its impact on the organization. A major topic that must be addressed is the data base administration function and how the organization may have to change to ensure the DBMS' success.

Alleviating Fears

This type of training is very important in that it helps alleviate the fears and political implications associated with installing a DBMS. A major advantage of using an outside vendor for this training is that the vendor has a high level of credibility because it is an external entity and has no ax to grind or empire to build. This enables the personnel being trained to concentrate on what is said, rather than who said it.

The training for the technical support personnel is necessary in order for the DBMS to be installed and implemented initially and then maintained and fine-tuned as additional applications are developed. These support personnel are primarily systems programmers and key operations personnel such as the master terminal operator. Usually this type of training is available only from the DBMS vendor itself.

It has been DBMI's experience that this training is usually anticipated, planned for and adequately provided. This training is for a limited number of people and often requires travel to a public offering rather than presentation of the course at the company's facility.

The third group that training must be provided for is those people who will staff the data base administration group. These people need training in both logical and physical data base design techniques. They must fully understand all the technical capabilities of the DBMS so that they can select those features that most efficiently satisfy the requirements of the application systems to be developed. Most often the training they require will be provided by the DBMS vendor. While there may in certain cases be sufficient numbers to merit an in-house presentation of both the logical and physical data base design courses, most often these people, like the technical support personnel, will have to travel to a public offering.

The last training group is the applications development personnel, which includes both analysts and programmers and constitutes the majority of the training effort. They must be made totally familiar with the capabilities provided by the DBMS so they can design systems that will efficiently utilize the DBMS capabilities while fully satisfying their users' applications requirements.

While in most installations the actual physical data base design is delegated to data base administration, it is very important that the applications personnel involved in the design effort be able to relate the system requirements to the DBMS capabilities that are available to satisfy those requirements. It has been DBMI's experience that the more knowledgeable applications personnel are about the capabilities of the DBMS, the better they can communicate applications requirements to data base administration, which results in efficient, effective data bases.

In those cases where a company is making a major commitment to the implementation of the DBMS, it is often most effective to have the applications programming courses make use of machine workshops. This enables the programmers to reinforce the lecture material in the same environment in which they will be developing applications. This can go a long way toward providing them with a frame of reference from which they can then develop their first applications programs. It also greatly eliminates the apprehension associated with one's first DBMS programming effort.

Vendor Training

Regarding the selection of an independent training vendor to provide DBMS training, the most important criteria is the quality of the training. The worse thing that can possibly be done is to select the cheapest vendor. The cost of a particular vendor is minor when you consider the total cost of providing the education, for example, the salaries of the attending personnel and the cost of the training facility. It has been DBMI's experience that an attempt to cut several hundred dollars per day off the instructor's bill can end up to be the most expensive saving possible.

It is of the utmost importance that the vendor be able to supply references indicating its previous ability to provide successfully this training to other companies. These references should be thoroughly checked out to ensure that the most qualified vendor is selected.

It is also important that the vendor be made aware of how the customer wishes to approach DBMS training. The vendor should be willing to customize the courses in order to reflect the customer's specific needs.

It is also very important to listen to vendor recommendations on how best to satisfy needs.

In summary, training is a key to a successful DBMS environment. Those companies that plan for and establish a comprehensive DBMS training program greatly enhance and ease their migration to a DBMS-based environment. Those that ignore training increase the likelihood of becoming the subject of a DBMS saga.

Wehr is founder and vice-president of DBMI with responsibility for the Educational Services Group, of which Gregoire is manager.

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Control Unit Lets Ascii Terminals Access IBM Hosts

DALLAS — Carterfone Communications Corp. has introduced a communications control unit that is said to allow Ascii terminals to access IBM host systems operating under the IBM Systems Network Architecture (SNA).

The Model 6274 is said to communicate with the IBM host via the Synchronous Data Link Control protocol. It is a physical unit type-two device, according to the spokesman.

Display station screen sizes of 1,920, 2,560 and 3,440 characters are supported on any 80-col Ascii terminal, according to a Carterfone spokesman.

Ascii printers attached to the 6274 can operate in both SNA character-string and data-stream-compatible modes, according to a Carterfone spokesman.

The unit reportedly addresses the desirability of allowing a nonintelligent, inexpensive terminal to emulate an IBM 3278 display and obtain access to a host for real-time applications.

Available in either eight-port or 16-port configurations, the Model 6274 can be accessed by terminals through direct connect capabilities, leased line capabilities and dial-up capabilities.

The price of the control unit is \$10,950, available from Carterfone, Suite 1400, 1111 W. Mockingbird Lane, Dallas, Texas 75247.

Wang VS Users Get Interface

LOWELL, Mass. — Wang Laboratories, Inc. has announced a data communications package for users of its VS product line said to permit asynchronous RS-232C-compatible devices to be accessed by a VS user application program in either VS Basic or VS Cobol.

The VS General Asynchronous Interface features the ability to define, control and communicate concurrently with up to six asynchronous RS-232C-compatible devices, resulting in the elimination of technical details usually associated with asynchronous communications, the vendor claimed.

The interface consists of a connection configuration utility, a set of subroutines and a data link processor to allow users to control asynchronous lines and associated foreign asynchronous devices, the company said.

The VS General Asynchronous Interface is priced at \$4,000 from Wang Laboratories, 1 Industrial Ave., Lowell, Mass. 01851.

Modems Run Over Coaxial Cable

DUBLIN, Calif. — A line of modems designed to handle data transmission over coaxial-cable systems has been announced by Multisonics, Inc.

The CM-250 series is aimed at cable TV data communications applications, such as computerized traffic control systems, where harsh operating conditions are the norm, the company said.

The modems are capable of creating up to 75 full-duplex data links using two 6-MHz cable channels, while communications between a master location and as many as 1,000 remotes can be supported when the modems are operating in the

FCC to Restructure Rates Of Wats Despite User Pleas

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Despite pleas from several large-volume telecommunications users, the Federal Communications Commission (FCC) has decided to push ahead with its efforts to restructure Wats rates.

A basic goal is to determine whether the discounts granted to heavy users are illegal and should be replaced by a unified tariff covering long-distance dial-up service — officially known as Message Toll Service (MTS) — and Wats.

Companies that make heavy use of Wats vehemently oppose this idea, fearing loss or substantial reduction of their discounts.

The latest development in the Wats drama, which has been playing at the FCC since the early '60s, was precipitated by a U.S. Appeals Court ruling last June. The court, saying it was not convinced that MTS and Wats are "like" services, as the FCC had decided in 1978, told the commission to reconsider.

This prompted a number of telecom-

munications users and user groups — representing the car rental, hotel/motel, airline and aerospace industries among others — to request deferral or termination of the FCC's Wats investigation. The petitioners argued that the investigation

Analysis

could not proceed until the "like" services issue has been settled. If the services are not similar, they said, there is no need to insist on a unified Wats/MTS tariff.

But the commission pointed out that the like service proceeding is only "one tool" for determining whether Wats users are paying their fair share of the public switched network's costs, and this concern "has not been disturbed" by the court's ruling. When the present investigation began last April, the commission added, it listed several other issues for investigation that are reportedly not dependent upon a

(Continued on Page 62)

Targets IBM Micro User

RJE Workstation Emulator Bows

LAGUNA HILLS, Calif. — A multiuser remote job entry (RJE) workstation emulator said to provide IBM host communications for the IBM Personal Computer has been announced by Persyst, Inc.

PC/Hasp was designed to enhance the Personal Computer in corporate DP, providing for concurrent support of up to seven multileaved input and output job streams, the company said. When initiated

Autodial Modem Announced

NEW BRIGHTON, Minn. — An automatic dialing modem has been announced by Multi-Tech Systems, Inc.

Operating at 300 and 1,200 bit/sec, the MT212A Autodial modem is said to provide full-duplex operation over switched networks and is reportedly fully Bell 212A-compatible.

The unit is capable of storing up to five numbers of up to 25 digits each, the vendor said. Numbers are entered and stored via terminal keyboard and are dialed with a single keystroke.

The stand-alone version of the modem costs \$795. Rack cards (modems without the enclosure) list for \$620, while a rack costs \$470. The firm is located at 82 Second Ave. S.E., New Brighton, Minn. 55112.

by the user, reader, printer and punch stream support can be directed to and from the console. In addition, the device allows support of multiple disk files and up to two asynchronous communications ports or multiple printers, the vendor claimed.

The emulator also features both transparent and nontransparent data transmission to allow user control of the transmission actions; variable-length message blocks to allow for maximum line efficiency and to cut high transmission costs; and an automatic sign-on routine to eliminate time-consuming user-initiated sign-ons, the company said.

The PC/Hasp emulator is priced at \$995 and is available immediately from Persyst, 22957 La Cadena, Laguna Hills, Calif. 92653.

Modem Controlled From Keyboard

SUNNYVALE, Calif. — A terminal-controlled modem that features autodialing and menu-controlled options has been announced by Prentice Corp.

Called the Prentice 212, the device has a nonvolatile memory and diagnostics, all of which can be completely controlled from the user's keyboard. It is intended for remote terminal applications and reportedly adds intelligent features to dumb terminals and eliminates the need for a phone because the numbers can be dialed from the keyboard or from modem memory.

The modem supports tandem dialing so that non-Bell networks such as Southern Pacific Communications Co.'s Sprint and MCI Communications Corp.'s MCI can be used. It is Bell 103- and 212-compatible and designed to operate over two-wire dial-up networks in the full-duplex mode at asynchronous data rates of 0 to 300 and 1,200 bit/sec.

The Prentice 212 is single-unit priced at \$795, and the vendor is based at 266 Caspian Drive, Sunnyvale, Calif. 94086.

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FCC to Restructure Wats Rates Despite Pleas From Large Users

(Continued from Page 61)
like service finding.

Most of these "other concerns" involve the "tapered" rate schedule in the present Wats tariff. Originally proposed by AT&T in 1980, the tapered rate allows the user to pay successively lower hourly rates as its monthly usage increases. The highest rate is charged for each of the

first 15 hours of usage and the lowest for each hour above 220 or 240 hours monthly (depending on whether it is using Outward or In-Wats, respectively).

According to the FCC, AT&T has failed to show that its costs for providing Wats decline with increasing usage. The commission has suggested that, as a result,

smaller volume Wats users and/or MTS users may be subsidizing those who qualify for taper discounts.

A related issue is whether reduction or elimination of the discounts would increase off-peak usage.

The FCC has been trying to smooth out the peaks and valleys in usage of the telephone network. The commissioners argue that this would save money for all users by reducing the need for adding facilities.

When AT&T filed the precursor of its present Wats tariff in 1980, the commission rejected it because no off-peak rates were included. Subsequently, AT&T added "time-of-day" rates, providing discounts of 35% to 65% to its tapered rate schedule — both effective in June 1981. However, Wats customers, particularly those with enough traffic to exploit the taper discounts, are not particularly interested in the time-of-day discounts because they would require making a lot more calls during nonbusiness hours.

The commission also plans to investigate a number of tariff provisions that bother Wats customers. For example, usage is now averaged over all the Wats lines leased by a customer, so heavy usage on a particular line does not necessarily qualify it for the related discount, and that tends to increase the bill.

In the upcoming investigation, officially known as Docket 80-765, AT&T's job, basically, will be to defend these practices and convince the commission that Wats discounts reflect actual costs. Initial comments from interested parties are due Dec. 7, and replies are due Jan. 21.

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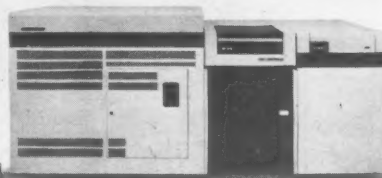
MANSFIELD, Mass. — Codex Corp. has introduced a new line of 9,600 bit/sec modems — one that offers a built-in, four-channel multiplexing capability and one that is a nonmultiplexer version.

The E Series includes the LSI E9600 and the LSI E9604. The LSI E9600 has a calculated mean time between failures of 36,000 hours, a vendor spokesman said. The LSI E9604 is the E Series nonmultiplexing version.

The LSI E9600 costs \$2,650 and the LSI E9604 costs \$3,200, according to the vendor. More information is available from Codex Corp., 20 Cabot Blvd., Mansfield, Mass. 02048.

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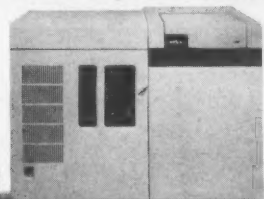
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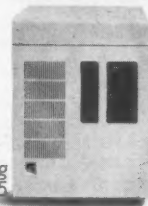
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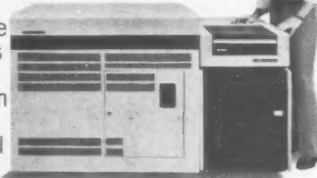
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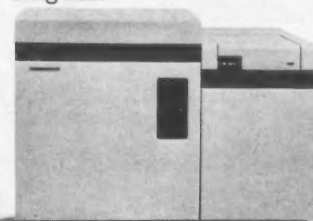


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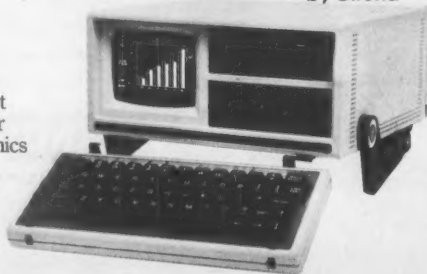
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Telephone Rate Hike Of 75% Predicted

WASHINGTON, D.C. — Charges for basic telephone service will increase 75% nationwide during the next five years, the House Government Operations Committee predicted in a recent report.

For rural users, the increase will be "more than 83%." In both cases, "approximately half" of the higher charges "can be directly attributed" to Federal Communications Commission (FCC) decisions, the committee added.

The House report seems likely to increase pressure in the next Congress for telecommunications legislation. Several previous attempts to revise the Communications Act of 1934 have failed, but the impending divestiture of the Bell operating companies may create a more favorable environment. Some legislators are worried that the divested companies will not be adequately financed.

The House report recommends that the FCC include a subsidy in whatever local-exchange access charges are ultimately imposed on intercity carriers.

The same report criticizes the FCC for deregulating the distribution of terminal equipment and inside wiring. The committee says the effect will be to reduce operating company revenues.

Modem Pair Announced

CHERRY HILL, N.J. — Datatel, Inc. has introduced two limited-distance modem products to replace conventional modems in applications where transmission distances are short.

The DCP (data communications product) 3050 and DCP 3150 Synchronous Limited Distance Modems are reportedly less expensive than long-haul modems and provide for operations speeds up to 9,500 bit/sec on telephone company lines and up to 19.2 bit/sec on private facilities.

The 3050 version is a tabletop synchronous modem intended for dedicated point-to-point or multidrop polled applications. The 3150 is a rack-mounted version of the 3050.

The Datatel units have a carrier detector circuit which provides a means for signaling between remote and local units. The units also include local analog and digital loopback and remote digital loopback capabilities.

The DCP 3050 is priced at \$420, and the 3150 costs \$380. Further details are available from Datatel at 1008 Astoria Blvd., Cherry Hill, N.J. 08034.

GTE Asks for Review Of FCC Resale Ruling

WASHINGTON, D.C. — GTE Telenet Communications Corp. has asked the U.S. Circuit Court of Appeals here to review the Federal Communications Commission's (FCC) recent international resale decision allowing enhanced communications services to be offered by U.S. international record carriers free of

Data Briefs

regulation.

The decision has aroused the anger of foreign governments, which contend that the commission should have first obtained the approval of the Consultative Committee on International Telephony and Telegraphy (CCITT), the policy-setting organization of the free world's telecommunications administrations.

Multinational U.S. firms reportedly are also upset.

Eighth Dems License Approved by FCC

WASHINGTON, D.C. — The eighth digital electronic message service (Dems) carrier to win a green light from the Federal Communications Commission (FCC) was announced last week.

It is Local Area Telecommunications, Inc., headquartered in New York.

The company plans to serve that city plus Atlanta, Bos-

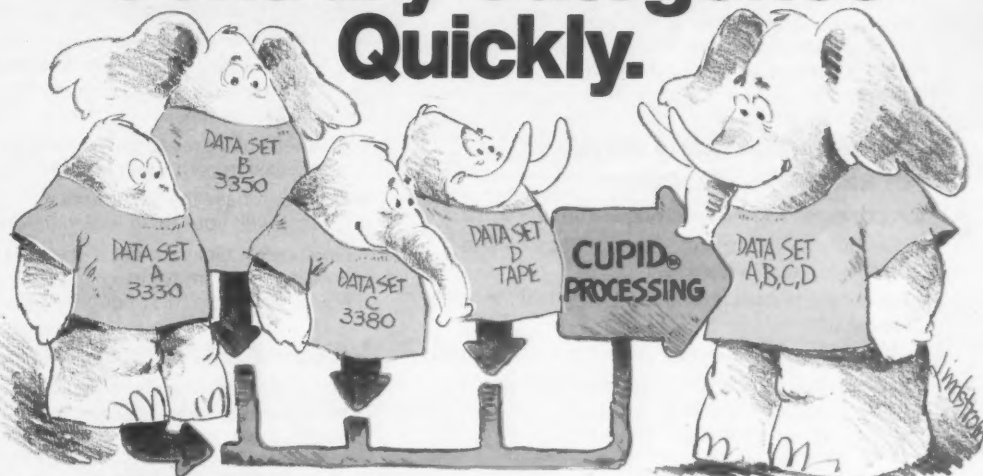
ton, Chicago, Dallas, Detroit and nine others.

Thirty-seven carriers have now applied for Dems licenses, including three AT&T operating companies — Michigan Bell Telephone Co., Pacific Telephone and Telegraph Co. and Chesapeake and Potomac Telephone Co.

All three intend to use Dems to supplement their existing Dataphone digital service offerings.

The FCC has not decided whether to let major telephone carriers or their subsidiaries offer Dems.

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Users Turning to PCMs

Disk Drive Supply Up, Prices to Stabilize

MEDFORD, N.Y. — There is good news for users who seek high-capacity IBM and IBM-compatible disk drives.

Last year's disk drive shortage, brought on by IBM's 14-month delay in delivering its 2G-byte 3380 disk drive, has subsided.

Spectra Units Fit VAX-11 Unibus

SUNNYVALE, Calif. — Spectra Logic Corp. has announced new models of its Spectra 12 disk controller and Spectra 21 multifunction disk/tape controller. The units are said to be compatible with Digital Equipment Corp. VAX-11 Unibus processors.

Called the "C" Models, the Spectra 12/C and Spectra 21/C can be attached to a DEC Unibus by emulating DEC's RX06/07 disk subsystem. The Spectra Logic devices can accommodate various disk types including the Eagle disk drives from Fujitsu, Ltd., the vendor said.

In addition, the vendor announced its current "A" series devices, which emulate DEC's RM02/05 disk subsystems and accept the Fujitsu Eagle drives, the vendor said.

The Spectra 12/A and 12/C cost \$2,900. The Spectra 21/A and Spectra 21/C cost \$3,600, the vendor said from 1227 Innsbruck Drive, Sunnyvale, Calif. 94086.

And disk prices will stabilize during 1983. However, despite availability, many users will be turning to plug-compatible manufacturers (PCM) rather than an IBM for equipment.

That is the consensus of a report recently issued by Applied Management Services (AMS), a research firm based here. According to the report, manufacturers of IBM-compatible disk drives are still riding high on orders for IBM 3350 and 3380 look-alikes. In addition, orders for plug-compatible 3380s have swelled because IBM has been unable to deliver appreciable numbers of 3380s during 1982, the report said.

AMS contends that users will continue to flock to 3380-like devices even though IBM deliveries of the 3380 are predicted to be stronger next year. The reason is that

3380-like devices take up less floor space than the 3380, making it more attractive to space-conscious users, the report noted. The IBM 3380 Model A, for example, requires users to leave space to open three swinging maintenance doors on the unit and the 3380 B units require the usual front and back maintenance doors. That means a string of five 3380s — with 10G bytes of storage — requires 180 sq ft of floor space.

On the other hand, a string of Storage Technology Corp. (STC) double-density 3350 disk drives, offering 9.6G bytes of storage, takes up 296 sq ft. "The bottom line," the report notes, "is that the IBM units offer only a 1.6 times improvement in floor space usage in relationship to their 2 to 1 improvement in density."

(Continued on Page 72)

Multifunction Turnkey System Performs Source Data Capture

NEW YORK — A "multifunction," microprocessor-based data entry system, called the Tartan Terminal System, has been introduced by Recognition Equipment, Inc. (REI).

The turnkey system reportedly can perform source data capture and document and transaction processing and error correction. It consists of an unlimited number of terminals, each of which maintains a separate operating system and can support software packages, including word pro-

cessing and a variety of packages written under its resident Digital Research, Inc. CP/M operating system. In addition, an electronic spreadsheet package called "Multiplan" is available for financial analysis, according to the vendor.

Industry standard languages, including Cobol, Basic and Fortran and a variety of text editing and file maintenance utilities, are supported. Data communications offerings include IBM 3780, remote IBM 3270 emulation and IBM Synchronous Data Link Control or High-Level Data Link Control, REI said.

The price for a typical configuration, consisting of the basic unit, 40M-byte disk, tape drive, 300 line/min printer, 10 CRTs and 768K bytes of memory, is under \$100,000. Delivery takes 90 days. More information is available from REI through P.O. Box 222307, Dallas, Texas 75222.

Micro-Based Powernet Targets Local and Distributed Processing

MCLEAN, Va. — Innovative Technology, Inc. has announced Powernet, a microcomputer-based distributed processing system for Sperry Univac 1100/82 systems. The system reportedly can also access time-sharing services provided by University Computing Corp.

Powernet can operate interactively with an 1100/82 host or as a stand-alone processing system. Powernet is based on Digital Data Systems, Inc.'s Adds Multivision microcomputers operating under Digital Data's Muon operating system. Muon is compatible with Digital Research, Inc.'s CP/M operating system, the vendor said.

Powernet is aimed at small companies or divisions of large companies. A fully configured four-user system costs \$15,000, the

vendor said from Suite 500, 7927 Jones Branch Drive, McLean, Va. 22102.

Nonimpact Printer Uses Ion Technology

FORT LAUDERDALE, Fla. — A high-speed, nonimpact printer that employs ion deposition imaging technology has been announced by Southern Systems, Inc. here.

The Mercurion I reportedly is capable of printing 5,280 line/min on 8½-in. by 11-in. paper at speeds of 60 page/min. It employs Model 2460 image output modules made by Delphax Systems, Inc. The printer also features graphics-quality resolution and can store and intermix up to eight

different type fonts on any line, a spokesman said.

The printer's ion deposition imaging technology uses multiple ion beams to charge a dielectric drum, which is then toned. The unit runs on equipment from IBM, Digital Equipment Corp., Data General Corp., Hewlett-Packard Co., Perkin-Elmer Corp. and Burroughs Corp.

The printer costs \$60,000, a spokesman said from 2841 Cypress Creek Road, Fort Lauderdale, Fla. 33309.

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Chromatics Offers Five Options For CGC 7900 Graphics System

TUCKER, Ga. — Chromatics, Inc. has announced five new product options for its CGC 7900 color graphics computer system.

An ACT I interface reportedly makes it possible to attach an ACT I nonimpact ink jet copier to the CGC 7900 for copying raster images or Ascii text directly from the graphics computer display memory. The interface costs \$495.

A read-only memory (ROM) expander card increases the present 7900 ROM capability from 64K bytes to a maximum of 512K bytes, using four cards. Each card costs \$1,295.

A remote fixed disk drive using Winchester-based technology allows up to two remote drives to be configured. This extends the system's high-speed mass storage capability to a maximum

80M Bytes. A 10M-byte drive costs \$5,995 and a 40M-byte drive costs \$10,995.

The 9-track tape interface supports several standard tape drives, including those made by Kennedy Co., Control Data Corp., Cipher Data Products, Inc. and Per-tec Computer Corp. The interface costs \$1,495.

An 11-in. by 11-in. digitizer

tablet with stylus and 5- or 16-button cursor can be interfaced with the CGC 7900 through any available serial port. The tablet reportedly can be used to digitize images by coordinate data point, implement menu selection or paint. The tablet costs \$2,995 from the vendor at 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

Vector Drafting System Based on 16-Bit Micro

BALTIMORE — Vector Automation, Inc. has announced Cadmax-II, a two-dimensional drafting system based on the firm's proprietary 16-bit microcomputer.

Cadmax-II incorporates user-friendly on-screen menus produced on the firm's vector refresh display terminals. The system is geared specifically for applications that require heavy

drafting, such as mechanical and electrical drawings. Other applications are supported as well.

The vendor said it performs all systems hardware and software engineering as well as system integration. A two-workstation version of Cadmax costs \$109,700 complete with drafting software from the Village of Cross Keys, Baltimore, Md. 21210.

Tektronix Enhances Terminals

BEAVERTON, Ore. — Tektronix, Inc. has announced enhanced versions of its graphics display terminals and reduced configuration prices.

The "A" series enhancements are available for existing 4110 series products at a field upgrade cost of \$1,100. Local programmability options, including Fortran, Local Plot 10, graphics utility software, low-level graphics interface and assemblers cost \$1,500.

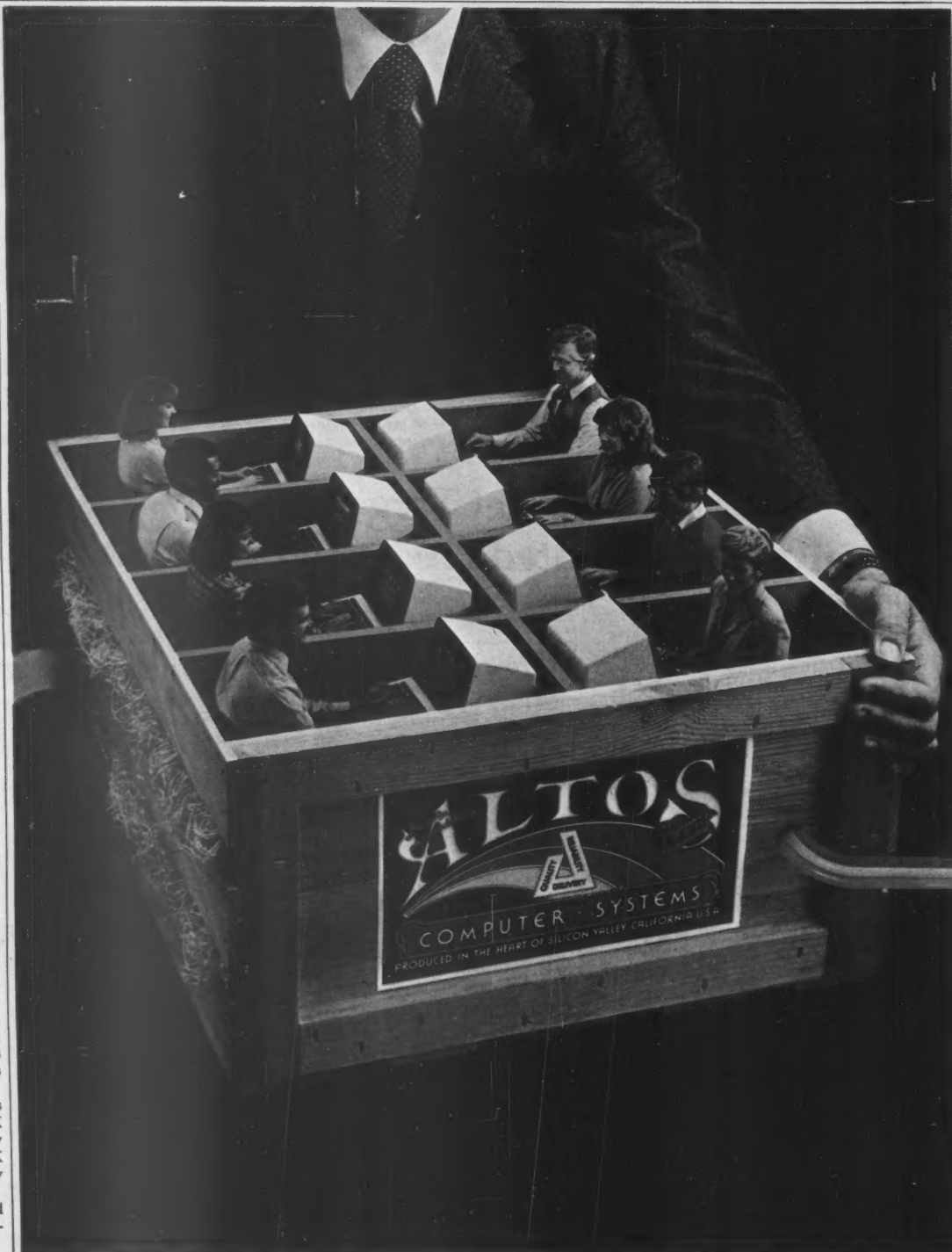
Base prices for enhanced 4110 series terminals are \$9,600 for the 4112A, \$16,500 for the 4113A and \$17,900 for the 4114A. Memory prices have also been reduced, ranging from 32K bytes, now priced at \$300, to 512K bytes, priced at \$4,600.

Disk drive prices for the 4110 series have also been reduced. The Option 42 single disk drive now costs \$1,700, with the Option 43 dual disk drive priced at \$2,600.

The 4050 series desktop computers have been enhanced to include Basic language, a more powerful graphics interface bus and overall increases in system speed. The 4052A costs \$9,900 and the 4054A costs \$20,100.

Memory price reductions include Option 22 for 32K bytes total memory, now \$150, and Option 24 for 64K bytes total memory, now \$290.

Tektronix can be contacted through P.O. Box 500, Beaverton, Ore. 97077.



Links Versabus, Motorola 3000 Standard Interface Announced

AUSTIN, Texas — Motorola Memory Systems has announced the MMS3351, a standard interface that connects its Versabus-based systems to the Motorola System 3000 mass storage unit.

The interface is comprised of three elements:

The Versabus Interface Card utilizes high-speed random-access memory chips arranged on-board for cache

operations. The company claimed that overall system access time with cache "hit" is less than 250 nsec and less than 1 μ sec for a cache "miss."

The Membus Interface Card (MICV) provides the logic required for the Membus interface. Error status information is transferred from the error correction card of the System 3000 to the Versabus

control status registers via the MICV.

The Cable Assembly/Signal translator is a flat ribbon cable that provides an interface to the P2 connector at the Versabus backplane, according to the vendor.

The Versabus interface assembly costs \$3,500, a spokesman said from 3501 Ed Bluestein Blvd., Austin, Texas 78721.

CAD/CAM Software Fits Series 80 Graphics Computer

ELK GROVE VILLAGE, Ill. — Cadlinc, Inc. has introduced computer-aided design and manufacturing operating system software said to permit operator interaction with up to 16 processes simultaneously on a single display. The system was designed to work with the firm's Series 80 graphics computer.

The Multi-Window Operat-

ing System is an extension of Bell Laboratories' Unix V7 operating system, also featured on the Series 80 computer. The Series 80 is based on the Intel Corp. Multibus system using a Motorola, Inc. 68000 CPU.

The system offers floating-point and disk expansion with Xerox Corp.'s Ethernet networking capability. The Series 80 with Multi-Window Operating System, 1M byte of memory and 12M bytes of fixed disk storage costs \$25,000 from the firm at 1872 Brummel Ave., Elk Grove Village, Ill. 60007.

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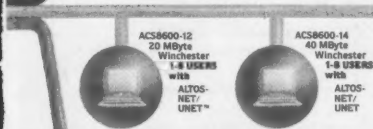
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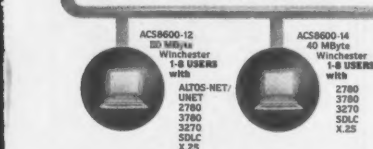
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Units Boost Protection

CARSON, Calif. — Computer Power Systems, Inc. has announced two products that protect computers against power disturbances.

The Iso-Max is an isolation transformer for users of large computers. The unit reportedly features high-grade electrostatic shielding, all-copper windings, voltage adjustment taps on each independent phase and high-quality safety grounding. The cost ranges from \$1,140 for a 15 KVA unit to \$3,500 for a 150 KVA unit.

The Micropower II is a power conditioner for users of minicomputers and small business systems. The product reportedly protects against dips, spikes, brown-outs, transients and voltage fluctuations. The unit reportedly includes load regulation, high/low voltage detector, electronically controlled tape switching, I/O filters, circuit breaker protection and a regulator range indicator.

Micropower II ranges in price from \$1,800 for a 3 KVA unit to \$3,795 for a 10 KVA unit. The company can be reached through P.O. Box 6240, 18150 S. Figueroa St., Carson, Calif. 90749.

Ultratech Offers Disk Cleaner

SANTA CLARA, Calif. — Ultratech Corp. announced a rigid disk cleaner said to achieve a total clean and spin-dry cycle time of less than 40 sec for 8-in. disks.

Disc Clean 1010 utilizes adjustable pressure water jets to clean rigid disks prior to application of thin films or oxides. The use of water as a cleaning fluid eliminates solvents in cleaning sensitive surfaces, the company said.

Disc Clean 1010 is priced at \$12,000 from Ultratech Corp., 2900 Stender Way, Santa Clara, Calif. 95051.

Latest IBM Disk Drive Predicted Out by Year's End

MEDFORD, N.Y. — Mainframes and disks are not the only targets plug-compatible manufacturers have drawn a bead on in their quest for users' dollars. Tape drives, and rumors of new tape technologies and products, are also included in their strategies.

Predictions that IBM is on the brink of announcing a new tape drive have flourished for about three years. One of the latest is included in Applied Management Services' (AMS) report on IBM disk and tape drive strategies, which claims that while the rumored tape drive has been plagued with technical problems, IBM will announce the new machine before the end of the year.

In the highly detailed report, AMS

says the new tape drive, which will be used as a backup device to IBM's 3380 disk drives, will mark a departure from industry-standard tape technologies. It will not use the 20-year-old standard 1½-in. reel of iron-oxide tape media, but will use a reel of ½-in. chromium dioxide tape which is packed in a cartridge 4-in. square, AMS reported. The tape will be designed to load itself onto an internal take-up reel and will be used primarily for save and restore functions, the report noted.

The tape unit is expected to be smaller and faster than IBM's current top-of-the-line tape unit, the 3420. However, with transfer rates up to 3M bit/sec, the drive's 4-in. cartridge will be able to store the same amount

of information as current 10-in. tape reels. The unit will also operate with IBM's 3380 disk controller, a companion to the 3380, the report said.

AMS explained that there are also some unanswered questions about the tape drive unit. For example, it is unclear whether the new tape drive will be able to read tapes from existing tape drives and whether the unit

will be compatible with existing IBM operating systems.

IBM has not announced the new drive because the research has been plagued with problems, AMS said.

IBM is characteristically mum on the subject of its rumored tape drive.

The report, entitled "The IBM Disk Crisis," costs \$75, AMS said through P.O. Box 350, Medford, N.Y. 11763.

As Disk Drive Shortage Subsides, Users Seen Sticking With PCMs

(Continued from Page 69)

In addition, IBM's 3380 stands 70½-in. high, the same height as IBM's 3380 controller. This poses a problem to computer operators who cannot

see across a computer room filled with 3380s, the report said. By contrast, the 3380-like drives from the three major plug-compatible manufacturers are not as high.

The three major IBM disk PCMs, Memorex Corp., STC and Control Data Corp., all have announced their own versions of the 3380 with deliveries scheduled for delivery to begin during 1983.

The AMS report, entitled, "The IBM Disk Crisis," costs \$75, the vendor said through P.O. Box 350, Medford, N.Y. 11763.

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8" DSDD Soft Sector (128 B/S, 26 Sectors)	3115	3.34
8" DSDD Soft Sector (256 B/S, 26 Sectors)	3103	3.34
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8" DSDD Soft Sector (1024 B/S, 8 Sectors)	3104	3.34
5 1/4" SSD Soft Sector w/Hub Ring	3481	2.34
5 1/4" SSD 10 Hard Sector w/Hub Ring	3483	2.34
5 1/4" SSD 16 Hard Sector w/Hub Ring	3485	2.34
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Memorex Quantum 2400 feet Easy Load II Cart.	27JR	16.99
Memorex Quantum 1200 feet Wrightline Seal	27FW	12.50
Memorex Cubic HD 2400 feet Wrightline Seal	39JW	18.99
Memorex Cubic HD 2400 feet Easy Load II	39JR	19.99
Memorex Cubic HD 1200 feet Wrightline Seal	39FW	13.99

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Migration Path Engineering — As always, NCR provides easy transition from one system to the next without difficult conversion of software.

For more information, just call toll free (800) 543-8130 (in Ohio, 800-762-6517). Or write to EDP Systems, NCR Corporation, Box 606, Dayton, Ohio 45401.

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Price of Strobe Graphics System Discounted \$200 Through 1982

MOUNTAIN VIEW, Calif. — The Strobe Graphics System has been discounted to \$795 from \$995 through the end of this year.

This product provides multicolor business graphics with Apple Computer, Inc., Osborne Computer Corp., Commodore International, Ltd. and Franklin Computer Corp. microcomputers. Available for an additional \$100 is an RS-232 intelligent serial interface with Digital Research, Inc. CP/M-based applications software, enabling it to work with IBM's Personal Computer and other CP/M-based systems.

The hardware includes a Strobe 100 Graphics Plotter with 500 point/in. resolution and multicolor capability

for reproducible graphics on any paper or transparency material. The software program, called the Business Graphics Package, produces line, bar and pie charts.

Strobe, Inc. is based at Building 5A, 897 Independence Ave., Mountain View, Calif. 94043.

Disk Drive Accepts Apple Floppies

PENNSAUKEN, N.J. — Franklin Computer Corp. has unveiled a 5¼-in. floppy disk drive system said to read and write any Apple Computer, Inc. Apple II-compatible diskette.

The Ace 10, based on Shugart Associates, Inc. 400 Series technology, incorporates a direct-drive stepping

Interface for IBM Micro Controls Video Playback

SAN MATEO, Calif. — An interface for the IBM Personal Computer, said to allow control of videotape and videodisk playback equipment from interactive video lesson programs, has been announced by Whitney Educational Services.

The interface is backed up by the company's new authoring program, Insight PC, which allows the writer to input instructions to the computer in English sentences, the company said.

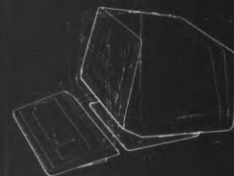
The interface allows delivery of selected segments of video material based on individual needs, with trainees having to respond to the computer program before being presented with material based on their answers, the vendor said.

The PC video interface is priced at \$990, with the Insight PC package available at the same price from Whitney Educational Services, Suite 402, 1777 Borel Place, San Mateo, Calif. 94402.

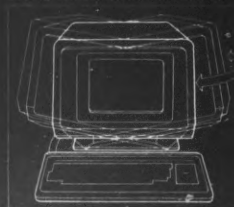
motor actuator using a spiral cam with a U-groove positive detent.

Available with a controller for a complete subsystem, the Ace 10 costs \$579. A second drive can be added for \$479. Franklin is located at 7030 Colonial Highway, Pennsauken, N.J. 08109.

VISUAL presents ergonomic elegance and high performance in a low-cost terminal.



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The VISUAL 50 represents a new approach in low cost terminals. Although it costs drastically less, it offers the features you expect from the high priced units.

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Another distinctive feature of the VISUAL 50 is its emulation capability. VISUAL 50 is code-for-code compatible with the Hazeltine Esprit,™ ADDS Viewpoint,™ Lear Siegler ADM-3A™ and DEC VT-52.™ Menu driven set-up modes in non-volatile memory allow easy selection of terminal parameters.

And you're not limited to mere emulation. As the chart shows, the VISUAL 50 has features and versatility the older, less powerful low cost terminals simply cannot match.

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FEATURE COMPARISON CHART					
FEATURE	VISUAL 50	Hazeltine Esprit	ADDS Viewpoint	Lear Siegler ADM-3A	Teletype 510
Tilt and Swivel	YES	NO	NO	NO	NO
Detached Keyboard	YES	NO	YES	NO	NO
N-Key Rollover	YES	NO	YES	NO	NO
audible Key Click	YES	YES	NO	NO	NO
Menu Set-Up Mode	YES	NO	NO	NO	NO
Status Line	YES	NO	NO	NO	NO
Full 5 Attribute Selection	YES	NO	NO	NO	YES
Smooth Scroll	YES	NO	NO	NO	NO
Line Drawing Character Set	YES	NO	NO	NO	NO
Block Mode	YES	YES	NO	NO	YES
Insert/Delete Line	YES	YES	NO	NO	YES
Bi-Directional Aux Port	YES	YES	NO	YES	NO
Columnar Tabbing	YES	YES	NO	NO	YES
Independent RCV/TX Rates	YES	NO	NO	NO	NO
Answerback User Programmable	YES	NO	NO	OPT	NO

ROM Available For HP 9845B/C

MOUNT HOLLY, N.J. — Two plug-in read-only memories (ROM) are available for the Hewlett-Packard Co. 9845B/C desktop computers from Structured Software Systems, Inc.

The Programmer's Tool Kit is said to offer new keyboard commands and utilities designed to aid in program development, debugging and documentation. The Tool Kit ROM with user manual costs \$1,500.

The Command File/Memory Mass Storage ROM adds two capabilities. Command File is said to allow a mode similar to batch processing of Basic programs to be run on the 9845B/C. Memory Mass Storage reportedly allows the 9845B/C to effectively act as a mass storage device. The Command File/Memory Mass Storage ROM with user manual costs \$1,000 from the firm at Box 1072, Irick Road, Mount Holly, N.J. 08060.

Board Features Four Sections

CHAMPAIGN, Ill. — A memory board featuring four independent sections, each capable of accepting four memory chips, has been announced by Central Data Corp.

The board will address between 4K and 256K bytes of erasable programmable read-only memory, 4K to 32K bytes of random-access memory or electrically erasable read-only memory, the vendor said. The access time for each bank is independently selectable from 175 nsec to 875 nsec.

The Eprom/Ram/Eeprom costs \$525 from Central Data Corp., 1602 Newton Drive, Champaign, Ill. 61820.



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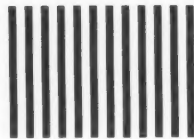


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Micro With Sealed Enclosure Bows

WALTHAM, Mass. — Comark Corp. has announced an 8-slot multibus industrial microcomputer that reportedly uses an environmentally sealed aluminum enclosure with a thermal heat exchanger to protect the card file and monitor from moisture, dust and oil.

The MB 851 features a 5-MHz Intel Corp. 8085 CPU, 64K bytes of random-access memory, 12-in. CRT monitor and thermal shut-off circuit-

ry, the company said.

With 45 days delivery, the MB 851 is priced at \$5,195

from Comark Corp., 257 Crescent St., Waltham, Mass. 02154.

Micro Power Conditioner Out

SAN DIEGO — Electronic Solutions, Inc. has announced the ES 500 power conditioner, which can be used with a variety of microcomputers.

The unit employs a regu-

lator design that provides line regulation of power spikes, hashes and surges.

A basic unit costs \$385 from 5780 Chesapeake Court, San Diego, Calif. 92123.

Kennedy Series 5300 Winnies Get Intelligent Formatter

MONROVIA, Calif. — Kennedy Co. has embedded an intelligent formatter in its 82M- and 165M-byte Series 5300 Winchester disk drives.

The Picoformatter is said to provide error correction, control searches and head selection. It also maps defective tracks, establishes track and sector configurations and formats data for read/write operations.

Disk drives with the Picoformatter can reportedly be installed on any minicomputer or microcomputer system, requiring only a simple interface coupler.

The unit — capable of sustaining devices with data rates up to 2.5M byte/sec — transfers data either through direct memory access or under programmed I/O, the vendor indicated.

The Model 5380 with Picoformatter costs \$4,995; the 53160 with Picoformatter costs \$6,150 from the firm at 1600 Shamrock Ave., Monrovia, Calif. 91016.

Small CPUs Get UPS

HILLSBOROUGH, N.C. — Wilmore Electronics Co., Inc. has announced a 250W Model 1407, an uninterruptible power supply (UPS) for small computer systems.

Features include frequency stability, LED system status indicators and a 2:1 output surge capability, the vendor said.

The unit reportedly is made up of a dc to ac converter, battery charger as well as sensing and line inverter circuitry.

The unit costs \$610. Wilmore Electronics can be reached through P.O. Box 1329, Hillsborough, N.C. 27278

GWP Offers Workstation

CONCORD, Mass. — A microcomputer-based workstation that can be used by end users and manufacturers to design specialized character and symbol fonts for dot matrix printers has been introduced by GWP Corp.

The latest addition to the firm's line of Programate workstations is said to let the user address individual pixels in an enlarged character matrix displayed on the video screen.

The workstation, including 5M-byte dual floppy disk storage, software and system desk costs \$16,500 from GWP Corp., based at 336 Baker Ave., Concord, Mass. 01742.



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the merging of host and personal processing affordable as well as practical. For information contact Direct, Incorporated, 1279 Lawrence Station Road, Sunnyvale, California 94086. Or call (408) 734-5504. Ask for a demonstration of our 1025 and 825.

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Electronic Mail Gets Targeted For Apple, Corvus

SANTA CLARA, Calif. — An electronic mail software package for Apple Computer, Inc. Apple II and Corvus Systems, Inc. Concept computers has been developed by Software Connections, Inc.

Mail Monitor is said to allow users on local-area networks to exchange letters or data. An optional version that supports a modem reportedly allows information to be transmitted over telephone lines. Both versions allow up to 64 Apple II workstations on a local network.

Apple II and Concept computers can be mixed on the same network. The software requires a Corvus network system — either the multiplexer star network or the Omninet distributed network system.

The local-area network costs \$495. The Mail Monitor with modem support costs \$750.

Although the central "post office" must be an Apple II, a \$200 diskette allows Concept workstations to be attached to the local-area network as any of the 64 workstations, a spokesman said from Suite 17, 1800 Wyatt Drive, Santa Clara, Calif. 95054.

Series for IBM Micro Makes Unit Ethernet-Compatible

MOUNTAIN VIEW, Calif. — 3Com Corp. has unveiled a series of IBM Personal Computer plug- and software-compatible products designed to connect the IBM devices together into a Xerox Corp. Ethernet local-area networking environment.

Etherseries is said to provide its users with the local network benefits of peripheral sharing, information sharing and personal communications. When the IBM Personal Computer is equipped with the Etherlink — a plug-in controller/transceiver board — it becomes a network station.

Etherlink's accompanying software diskette permits users to share cooperatively files and printers located at other Personal Computer stations. Each station retains all its personal computing properties with the added benefit of network participation, 3Com said.

Ethershare, another Etherseries product, is a microcomputer-based network server with a 10M-byte Winchester disk drive. It concurrently supports many network stations and reportedly allows station users to take advantage of the quick disk access, high-speed data transfer and large storage capacity.

Workstation Installation To Cause Headaches for Planners: Analyst

By Bob Johnson
CW New York Bureau

NEW YORK — Forty million automated office workstations will be installed in the U.S. by 1986 and that forecast means problems for office automation planners, according to David Terrie, senior analyst for International Data Corp. (IDC).

Speaking at a session on "Planning for Office Automation" at the ninth annual International Information Management Exposition and Conference (Info '82) here recently, Terrie told attendees that the huge amount of installed automated office equipment expected to enter the market will translate into the monumental task of getting the hardware on users' desks and getting it to work correctly.

The speaker said that nearly 20 million terminals will be installed for the technically unsophisticated end user who is going to require a lot of support and hand holding.

"At least half of all of the equipment installed is going to cause a great deal

of trauma for the office planner," he predicted.

Terrie also pointed to another problem that will plague the office automation market in the form of DP budget fragmentation.

Control of the equipment budget in corporations is shifting away from the traditional management information systems (MIS) department and is being scattered among many departments, according to the researcher.

He referred to IDC research that revealed that in 1971 MIS departments had virtually total control of the DP equipment budget, while 1981 figures show MIS controlling only 70% of the budget.

This division of buying power will compound the confusion that promises to arise, according to Terrie.

Office automation systems in the past have been allowed to "sow their wild oats," resulting in a legacy of "illegitimate kids," Terrie said. He said the haziness of the industry spawned

(Continued on Page 84)

Pitney Bowes Unveils Desktops

STAMFORD, Conn. — Pitney Bowes, Inc. has entered the facsimile market with the introduction of four automatic desktop units. The product line ranges from a low-cost analog machine to a full-featured digital machine that is said to receive or transmit a page of text in 20 seconds.

The Model 8300 is an analog transceiver with CCITT compatibility. It receives at three- and six-minute settings and produces a resolution of 96 by 96 line/in. Up to 120 pages can be received automatically and the 8300 adjusts to the correct speed of the remote sending or receiving unit, a vendor spokesman said. It costs \$2,995.

The Model 8400 is a high-speed analog transceiver that is CCITT-compatible and stacks up to 30 documents. It costs \$4,995.

The Model 8600 is said to be a high-speed digital transceiver with a 4,800 bit/sec modem with automatic fallback to 2,400 bit/sec. It costs \$6,995.

The Model 8800 is also a high-speed digital transceiver with a 9,600 bit/sec modem with fallback to 7,200, 4,800 and 2,400 bit/sec. It costs \$8,995.

More information on these products is available from Pitney Bowes, Walter H. Wheeler Jr. Drive, Stamford, Conn. 06926.

People on the network can use security "passwords" to access common data files, text files and programs on Ethershare. They can also expand Ethershare to gain other network services using add-on software packages.

Etherlink costs \$950 and Ethershare, \$11,500. Etherprint costs \$750 and Ethermail, \$1,500, 3Com said from 1390 Shorebird Way, Mountain View, Calif. 94043.

Printer Boasts Multiple Features

WESTLAKE VILLAGE, Calif. — Wordplex Corp. has introduced a daisywheel printer that features letter-quality type, a print rate of 17 char./sec and six-copy capability.

In addition to bidirectional printing, the unit's features include modular design and 10-, 12- and 15-pitch spacing. Interfaces include microbus 8-bit parallel and RS-232C.

The printer is available for \$1,300 from Wordplex, 141 Triunfo Canyon Road, Westlake Village, Calif. 91361.

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Leasametric makes the most popular line of CRTs in the world. Now Leasametric's top products can be yours within 24-hours through Leasametric, the world's largest DP and electronic test equipment rental company. Other Leasametric alternatives include rental with option to buy, lease, and purchase. Flexible financing is available. The Televideo Model 925 offers ergonomic design, detachable keyboard and editing capabilities. The 950 adds programmable keyfunctions. Choose the basic Model 910 for maximum economy. All models feature Televideo's eye-easy green phosphor screens. The number to call is 800-447-4700. In Illinois, call 800-322-4400. In Canada, call 1-800-268-6923.

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BBN Updates Infomail System

CAMBRIDGE, Mass. — BBN Computer Corp. has introduced Release 2.0 of its Infomail electronic mail and information management system, offering a communications option.

The package runs on IBM computers under VM/CMS on MVS TSO; on the Digital Equipment Corp. VAX-11 family under VMS; and on BBN's C machines under the Bell Laboratories Unix operating system.

The release is said to support more concurrent users and a wider variety of terminals, including color IBM Models 3, 4 and 5 and communicating word processors.

The package is available for \$5,000 from BBN Computer Corp., 33 Moulton St., Cambridge, Mass. 02238.

For Records Managers

IRM DBMS Out for IBM Mainframes

FALLS CHURCH, Va. — A specially licensed version of the Infodata Systems, Inc. Inquire information resource management data base management system software has been unveiled here for records managers with IBM mainframes running under MVS, VSI or VM/CMS.

Called Icar (Infodata Computer-Assisted Retrieval), this release reportedly drives Kodak Corp.'s IMT-100 and IMT-150 Intelligent Microimage Terminals.

The software provides document indexing and sorting to any desired depth, the vendor said. It also provides simple query language and fill-in-the-blank computer data entry, according to the vendor.

Automatic coupling to the IMT is achieved through several methods including: automatic display of single microfilm images, downloading of multiple film addresses with one search and selective display, the ven-

дор explained.

Icar is licensed at \$40,000, the vendor said. Further details about the product may be obtained from Infodata at 5205 Leesburg Pike, Falls Church, Va. 22041.

OA Planning Headaches Foreseen

(Continued from Page 83)

incompatible systems, badly implemented systems, ill-advised purchasers and unsatisfied users. Because of these things, today's office systems are being held accountable for their misgivings, adding another area of concern for the planner, he noted.

"The current planner cannot just be concerned with the choice of hard-

ware for his needs, but also about how it will be implemented. Those mistakes made in the past could be disastrous for the office automation plan today," he said.

In order to deal with these future office automation problems, the speaker offered three basic approaches to planning based on IDC user surveys.

One was the "missionary approach," where companies use pilot projects, internal consulting and user education in a concerted planning effort for a successful automated office environment.

A second method involves the "persuasive approach," Terrie said. In this scenario, users suggest needed hardware and software while monitoring office automation spending in hopes of persuading management of the cost-effectiveness of equipment acquisition.

The last approach, and the one the speaker feels is most effective, is the "coercive" approach to planning.

Although it sounds like a cold method, this approach offers control of hardware and software purchasing and standardization of procedures throughout the company, Terrie said. In addition, since a single authority is in control, a list of "required" vendors is maintained.

There are also different styles of decision making that planners can put into effect, Terrie said. Depending on the size of an organization's operation, planning can be handled a number of ways. One standard method is user suggestions to the MIS department. Other decisions could be made by DP/MIS or DP/MIS and the office automation group together, Terrie said.

The latter two plans are said to be most effective, especially in larger companies where more input is needed from a variety of areas, because they justify spending more of the allocated budget.

Interface Serves Micro Storage

ANAHEIM, Calif. — IQ Systems has announced a Xerox Corp. 820-transparent interface to its Graymatter line of hard-disk mass storage systems for personal computers.

Xerox 820 users can configure the Graymatter in 5M-, 10M- or 20M-byte capacities that are field-expandable using a kit provided by IQ. The Graymatter line reportedly is based on Seagate Technology 5¼-in. Winchester-type disk drives.

A complete Graymatter 5M-byte turnkey system costs \$1,895, including interface. A 10M-byte system costs \$2,495, and a 20M-byte system costs \$3,695. The price for the interface alone is \$200, a spokesman said from 2931 La Jolla St., Anaheim, Calif. 92806.

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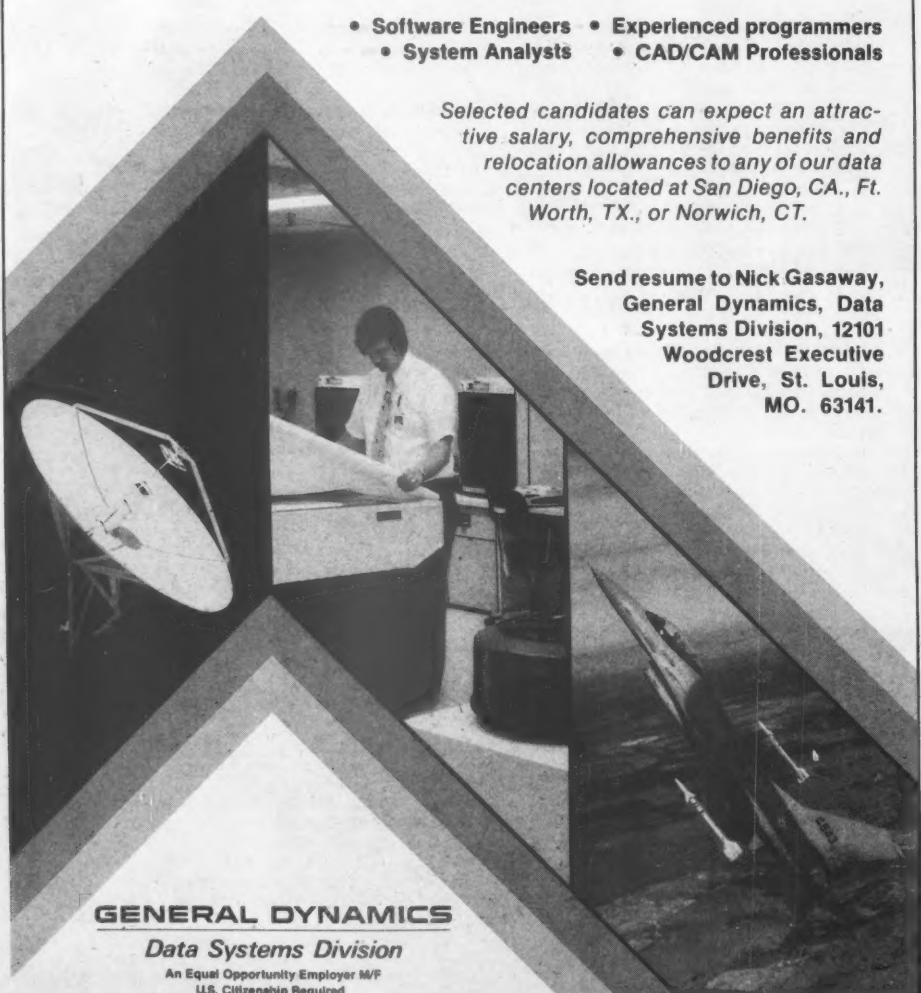
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Micro Cents, Mainframe Dollars: Gap Narrows in '81

By Robert Batt

CW West Coast Bureau
STAMFORD, Conn. — For each dollar spent on mainframes in 1981, about 10 cents were spent on microcomputers, a 100% increase over 1980, according to an annual review of the information processing industry by the Gartner Group.

The figures contained in the "Top 100 Almanac," the research firm said, attest to the proliferation of computing power throughout the corporate environment and to the fast-growing popularity of home computers. The 405-page review is the third such edition Gartner has published.

Company data compiled in the report includes an analysis of research and development, capital spending, employment and revenue and earnings patterns. Information from official corporate documents as well as questionnaires and personal interviews were all used as input to reveal trends among industry leaders and upstarts, the company said.

For example, the report found that any belief that the DP industry is recessionproof is more myth than reality. Eleven of the 100 firms surveyed by Gartner experienced absolute revenue declines in 1981, although the overall DP-related revenues of the firms rose 8.5%, more than four times the real increase in the gross national product in the same period.

The report found further that busi-
(Continued on Page 94)

Honeywell's Renier Easing Into Top Info Systems Spot

By Marcia Blumenthal

CW Staff

NEW YORK — The elaborate press conference earlier this month at which Honeywell, Inc. announced its DPS 88 [CW, Oct. 18] marked the first major appearance of Dr. James J. Renier, the firm's new vice-chairman and president of the Information Systems unit, since the surprise shake-up in top management late last month that saw the demotion of Steven G. Jerritts.

While Jerritts was present at the press conference in his new capacity as vice-president of international marketing, he did not participate in any of the activities connected with the event. Sources inside Honeywell confirmed rumors that Jerritts would not remain with the firm much longer.

After two years of declining earnings "it was time to change captains of the ship," commented Ulric Weil, a vice-president with Morgan Stanley & Co. "A bunch of circumstances conspired against Jerritts looking good."

One of these circumstances was the Level 6 minicomputer program, which never met the company's expectations, Weil said.

Honeywell's announcement of the high-end DPS 88 systems was a necessity, particularly in light of the recent unveiling of Sperry Univac's 1100/90 series and high-end system announcements made by IBM

and Control Data Corp., analysts agreed. And Weil saw the move as a demonstration by Honeywell that it intends to remain a competitor in the high-end computer business.

In an interview just prior to the press conference, Renier, who is reportedly well liked within the company, said he is in the process of getting up to speed on the information system portion of the business. In his former position as president of Honeywell's control systems business, Renier instituted "a thousand" quality circle operations and is known for his participatory management style, which he said is uncharacteristic of the information side of the business.

"The achievements of corporate executives should be both financial and working with personal objectives of individuals within the organization," Renier said. "It involves optimizing both, not maximizing one at the expense of the other."

Although Renier comes from the controls side of the business, he did a stint in the information systems side of the house between 1968 and 1974, when he estab-

(Continued on Page 90)



CW Photo by M. Blumenthal

Jim Renier, new president of Honeywell's Information Systems unit, sees the company in the 'integrated systems business where the minicomputer is as significant to our large systems thrust' as it is as a stand-alone product.

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Two Silicon Valley Dealers Arrested in 'Sting' Financed By National Semi, Signetics

PALO ALTO, Calif. — A "sting" operation financed by National Semiconductor Corp. and Signetics Corp. has resulted in the arrest of two Silicon Valley electronics dealers on charges that they received stolen property.

Edward Monberg, president of Dealin' Electronics, and Barry Poon of Microware Exceltic were arrested after allegedly purchasing "stolen" parts supplied by the two semiconductor companies.

National Semi and Signetics hired Barrick Security Group, a San Mateo, Calif.-based security organization, to investigate a series of chip thefts from their Silicon Valley locations. Over a six-month period, the security firm was supplied with about \$350,000 worth of electronic components. During the operation, Barrick undercover agents posing as thieves entered the so-called gray market for electronic parts.

According to Richard Camps, vice-president of Barrick, many electronic surplus dealers operate in this market. "Seventy percent of their dealings are legitimate, but if the deal looks right they will close their eyes to dubious products. They have fence reputations," he said.

Camps claimed Monberg was suspected of being involved in previous "fencing operations" with Signetics. Bruce Radetich, corporate investigator at Signetics said, "We began an investigation in December 1981 into a group of young people in their early 20s who had stolen \$120,000 worth of integrated circuits from off the dock of our distributor's warehouse. From that investigation, we learned the parts had been sold to Monberg. The current operation is a spin-off from that investigation."

Monberg's attorney, Charles Constantinides, vehemently denied the allegations against his client, asserting they were "typically vague and lacking in credibility."

Monberg was even more forthcoming: "These allegations are totally unsubstantiated. They are being brought against me by parties who are resentful of people who are doing well in the market at a time when Signetics and National Semi are in a state of shock about competition from the Japanese, and they are lashing out hysterically in any direction," he said.

Monberg said he intended to plead not guilty to the charges of receiving stolen property.

The charges brought against Poon appear to be even more intricate. According to the plaintiffs, an undercover agent working for Barrick was directed to the south San Francisco-based businessman who immediately began buying the allegedly stolen parts. Camps said Poon bought the parts fully believing they were stolen and said they would be sent to his brother Patrick in Hong Kong.

Patrick Poon is accused by Barrick of dealing in "counterfeit" Apple II computers. The sting operation, said Camps, was reported to Apple Computer, Inc. and requests have been

made to the Hong Kong police for the arrest of Patrick Poon.

"Barry Poon requested that we supply him with 2716 Eeproms [erasable programmable read-only memories] to be shipped to his brother. They expressed a good deal of interest when we said we would give them preferential pricing on this product in return for preferential pricing on counterfeit Apple IIs shipped to us from Hong Kong," Camps added.

Barry Poon, a citizen of Taiwan, was unavailable for comment.

This latest sting operation, following the recent case involving the Federal Bureau of Investigation, IBM and Hitachi, Ltd., underscores the increasing nervousness of Silicon Valley computer firms to alleged trade thefts. A spokesman for National Semi explained, "We entered into this operation with Signetics because we believe it prudent to share our resources in combating the theft of company products... We have been operating with law enforcement agencies to investigate the gray market and stem the tide against these sort of thefts."

According to some industry analysts, however, the gray market is in part the creation of semiconductor manufacturers and systems houses themselves. Chip users who need a large supply of standard chips often find it easiest to get supplies from fringe dealers rather than from the big manufacturers who cannot supply large volumes on short notice.

Bob Zook, a high-technology management consultant at Arthur D. Little, Inc. in San Francisco, explained, "It's a supply and demand situation. The industry is still fairly unsophisticated and its rapid growth has led to some nebulous marketing channels. As such, when a user collects too large an inventory of semiconductor components, he will sell it through a dealer to someone who needs parts." Zook, who once worked in the semiconductor industry, said that in this type of situation a second market inevitably grows up into which those in need go to look for parts. "They will go to any source they can find, particularly for standard chips, and so they are therefore susceptible to dubious practices," he concluded.

Data Remote Testing Subject of Report

NEW YORK — Frost and Sullivan, Inc. has released a report titled "Data Remote Testing Equipment Market in the U.S.," that predicts an eight-fold increase for remote data testing gear by 1990.

The report distinguishes the remote data test market from that for voice communications. A user survey found data networks can range to nearly 14% of a company's overall data communications expenditures. The first and foremost application is for troubleshooting, followed closely behind by network fault isolation.

The report is available for \$1,100 from Frost and Sullivan, 106 Fulton St., New York, N.Y. 10038.



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Computer Store Boom Causing Concern

Expert Warns of Pitfalls in Becoming Franchisee

By Robert Batt

CW West Coast Bureau
LOS ANGELES — Information systems professionals who are interested in becoming franchisees of operations such as computer stores should be wary of the numerous pitfalls involved, an industry expert has warned.

Bill Manger, president of Franchise Solutions, Inc., a consulting firm based here, said the cards are very heavily stacked against the franchisee and as a result a number of abuses have surfaced.

He particularly warned people who might be tempted by the prospect of absentee ownership — a situation in which the franchisee owns the franchise but leaves the day-to-day management of the business to someone else — to be wary of such an arrangement.

'Not Antifranchisor'

Manger, a former staff attorney for the U.S. Securities and Exchange Commission, acts as a counsel for franchisees as well as being an independent consultant to franchisors. He has helped to set up numerous franchise operations. "I am not antifranchisor, and not all franchisors behave badly towards their franchisees. However, I think it is necessary that bad

business practices are pointed out so as to strengthen existing franchisor-franchisee relationships," he said.

He asserted that a major problem in the franchisor-franchisee relationship is the unequal bargaining position between the two, with the advantage heavily weighted in favor of the former. "The charges to be paid, for example, are so skewed against the franchisee that the franchisor often comes out looking like a bandit," he said.

Manger claimed he knew of one case where the franchisee realized earnings of over \$300,000 but because of constraints and charges put upon him by the franchisor, he was unable to make a profit.

One typical constraint a franchisee faces is that he must buy from vendors specified by the franchisor.

Manger warned computer professionals thinking about owning a franchise to take into account the considerable personal investment such a move requires.

"Even very big franchisees are often barely making the minimum profits outlined in their prospectuses. This can be a big blow to a person who usually invests all of his life's savings in a franchise, takes out a second mortgage

Manger is 'not antifranchisor, and not all franchisors behave badly towards their franchisees. However, I think it is necessary that bad business practices are pointed out so as to strengthen existing franchisor-franchisee relationships.'

on his home and carries a huge amount of debt to make the considerable capital investment required to start up a business," he said.

"Franchisees are not always the most sophisticated of businessmen and they can become very vulnerable as a result. This is particularly true of a person who may be an Einstein technically but when it comes to evaluating the effectiveness of a franchise, could make some catastrophic choices," he noted.

Guidelines Offered

Manger offered some general guidelines to computer professionals thinking of entering into a franchise arrangement.

- Never believe what the franchisor says in his prospectus.

- Question other franchisees and assess what profit performances they are experiencing.

- Under Federal Trade Commission regulations, franchisors are obligated to divulge any litigation they are involved in. Contact the franchisor's attorney to see what the litigation is all about. "This may show up any sharp practices being employed by the franchisor," said Manger.

- Look at land costs, talk with contractors to gain an estimate of what any leasehold improvements would cost and compare them with the franchisor's estimates

- Study gross revenues you expect to make from your business. Subtract all the charges you need to make to the franchisor and, as a result, make your own assessment of what your likely re-

pected over the next decade, he argued, DP professionals will need to be on their guard as more and more computer-related franchises spring up.

A spokesman for the International Franchise Association (IFA) in Washington D.C. said that although abuses still exist, a code of ethics has been drawn up by which IFA members are obliged to abide.

turn on investment will be.

Manger charged that there was a conspicuous lack of basic ethics in a lot of dealings surrounding franchise operations. With the proliferation of computer technology ex-

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Ministry Management Systems (MMS) has opened

a new headquarters complex in Sunnyvale, Calif. The opening also marked the formation of Personal Computer Management Corp., the new parent company of MMS, Signature Computer Corp. and Home Computer Software Co.

Emulex Corp. has expanded its corporate manufacturing facilities with the opening of an 11,500 sq-ft plant in Dorado, Puerto Rico.

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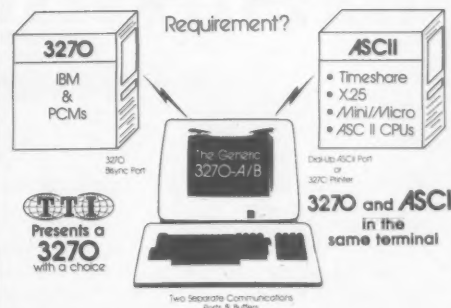
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CW Photo by M. Blumenthal

Frederic Withington believes that as systems become differentiated by value-added features, interface standards will become more critical.

Exec to Law Forum: Computer Litigation To Reflect Industry Structure Changes

By Marcia Blumenthal
CW Staff

WALTHAM, Mass. — Technology is hastening a change in computer products, which in turn is changing the structure of the industry, according to Frederic G. Withington, a vice-president with Arthur D. Little, Inc.

Speaking recently at the inaugural meeting of the New England Law Forum — a group of lawyers interested in the computer industry — Withington added that the change in the industry structure will be reflected in a corresponding change in computer litigation. In the future, he said, there will be less legal emphasis on competition and antitrust and

more attention paid to regulations and industry standards and copyright and trade secrets law.

Describing the current state of the industry, Withington said that "soft things are becoming a bigger part of the industry. It is not the classic IBM marketing strategy. We are not yet clear about what we are looking at."

Cost pressures facing vendors today are causing them to rethink their goal of becoming fully integrated. All vendors will have to buy more from outside suppliers, Withington said.

For example, the hardware for workstations is becoming more standard, while users are increasing their

options of which "modules" (applications) they like best. These users will have to be serviced by "module providers."

Retailers are not yet capable of becoming module providers, but it is clear they will have "a certain amount of control of the marketplace," Withington said. There is bound to be tension between corporate system providers and module providers.

And as systems become differentiated by the "soft" value-added features, issues of interface standards will become more critical — for example, who must publish standards and when.

The New England Law Forum holds regularly scheduled informal meetings. Further information is available from Peter A. Marx, vice-president, secretary and general counsel at Interactive Data Corp., 486 Totten Pond Road, Waltham, Mass. 02154.

Renier Eases Into Top Spot

(Continued from Page 85)

lished the firm's Federal Systems Division.

When asked about the poor performance of the minicomputer portion of the business, which Honeywell executives in the past had touted as the shining future of the business, Renier said that he sees Honeywell in the "integrated system business where the minicomputer is as significant to our large-systems thrust" as it is as a stand-alone product.

In recent months Honeywell has stepped up its interest in the communications business through a series of acquisitions. As yet, the firm's strategy is not clear, but Renier explained that the tie between energy conservation, building management and security along with office automation cannot ignore digital communications.

The public statement announcing Renier's appointment alluded to a chance to institute new ideas and technology in the information systems portion of the business.

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Executive Corner

- Yoshito Yamaguchi has been appointed president of Mitsubishi Electronics America, Inc.
- John J. Mitcham has joined Memorex Corp. as president of the Memorex Communications Group.
- Don Pearson has been elected president of Via Computer, Inc.
- Flavil Q. Van Dyke has been appointed Genigraphics Corp.'s president and chief executive officer.
- D.W. "Scotty" McArthur has been named vice-president of 3M Corp.'s Information Systems Group, and John O. Frisvold has been named vice-president of the company's new Office Systems Division.
- Thomas M. Cannon has been appointed vice-president of marketing for Conmarc Systems.
- William J. Coleman has

been appointed to the newly created post of vice-president of sales for Nestar Systems, Inc.

• Russ Kelly has been promoted to vice-president of marketing at General Business Computers, Inc.

• Dean Dixon has been appointed vice-president of satellite systems sales and marketing for Anixter-Mark, a unit of Anixter Bros., Inc.

• Dr. Joseph E. Rowe has been elected senior vice-president of research and development for Gould, Inc.

• A.A. (Tony) Carlson has been named vice-president of Torotel, Inc.'s telecommunications systems consulting and development subsidiary, Torotel Systems, Inc.

• Andrew Varadi has been appointed vice-president of technology for National Semiconductor Corp.

• James D. Butterworth has been named vice-president of marketing at Prentice Corp.

• Anthony R. Cammarano has been appointed vice-president of operations at Via Systems, Inc.

• Lloyd W. Fugate has been appointed vice-president of marketing for Lexidata Corp.

Why two when one will do?



Lee Data's universal terminal system design provides access to both 3270 and VT100 applications.

Now with Lee Data's new 3270/Async Communication System (Series 400) you can eliminate the cost and inconvenience of needing separate displays for access to 3270 and VT100 applications.

The Lee Data universal terminal system approach is another innovative Lee Data design that allows a single Lee Data display to access applications and data from an IBM CPU, a non-IBM system such as DEC, H-P or Prime, and timesharing services. And a simple command entered from the display keyboard is all that is required to switch from 3270 to VT100 operating mode and back again. What could be easier?

The Series 400 System incorporates a new hybrid approach to system operation that is simpler and more efficient than

protocol conversion. This approach allows a Lee Data controller to provide dedicated 3270 and VT100 processors for concurrent, but independent application access.

In addition, a single Lee Data controller provides you 3270 compatibility via either a remote BSC or SNA/SDLC or a local SNA or non-SNA interface, as well as 1 to 16 RS232C ports for your asynchronous application needs. Line speeds available are from 300 to 19,200 BPS.

The Series 400 System also provides you support for up to 32 devices, including Lee Data's unique All-In-One display that offers dynamic selection of 4 screen sizes—three 80-column and one 132-column. Lee Data's 3279-compatible color displays and a full line of printers are

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Micros Gain Market Share

(Continued from Page 85)
ness was better in the 1981 in the U.S. than it was abroad, in contrast to the opposite experience of 1980. Revenues increased 23.6% in 1981, compared with 11.6% internationally.

Other significant trends:

• IBM's share of industry revenues continued to decline, slipping to 38.1% from the previous year's 38.8% and 39.3% in 1979.

• Mainframe manufacturers lost market share, declining from 64.2% in 1979 to 61.5% in 1980 and 59.7% in 1981.

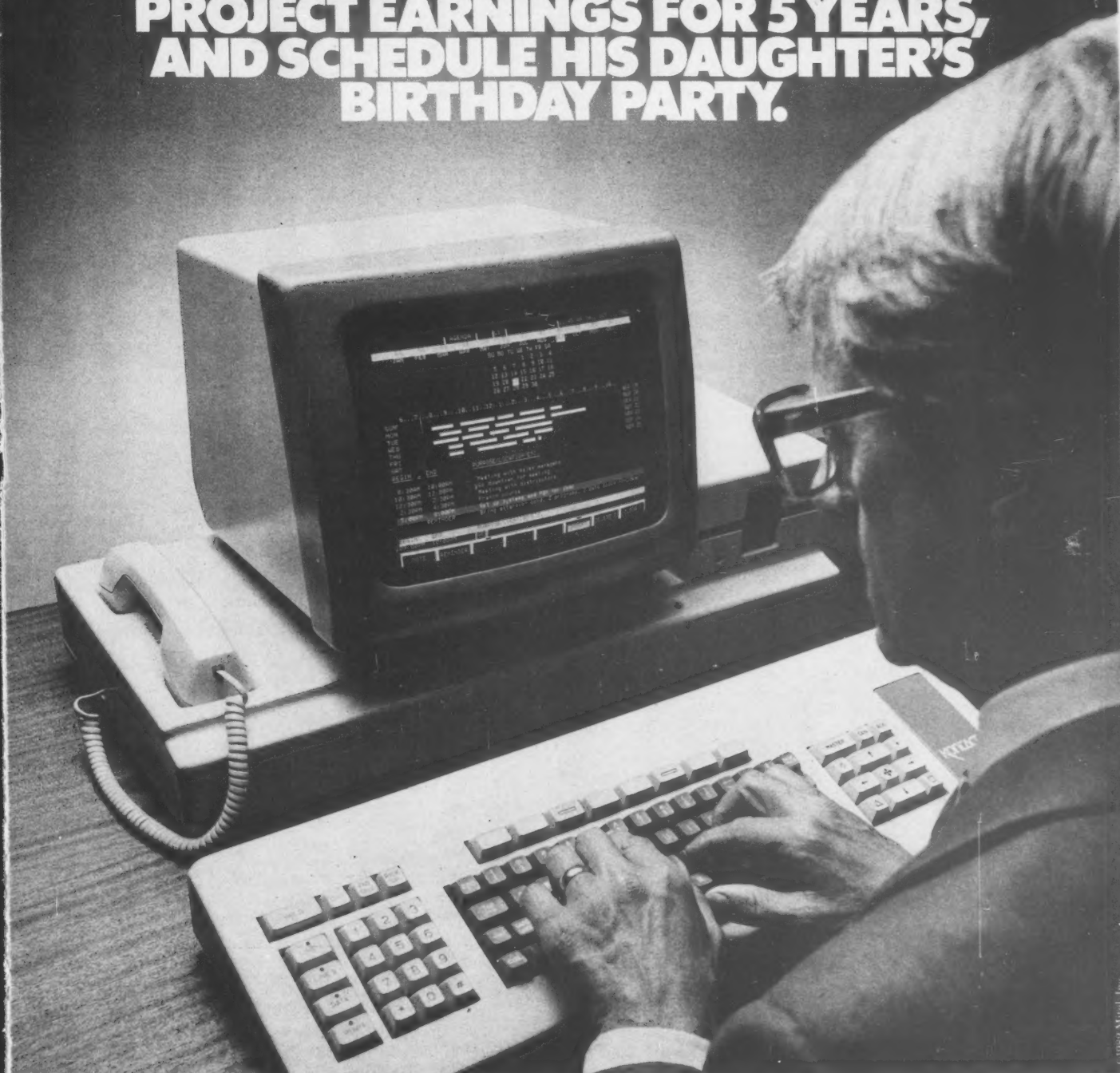
• IBM continues to harvest around 60% of the industry's operating profits.

• Microcomputing, word processing and computer-aided design and manufacturing were the fastest growing industry segments.

• Wang Laboratories, Inc. and Storage Technology Corp. replaced Memorex Corp. and Xerox Corp. in the top 10 companies, based on revenues of computer products and services.

The "Top 100 Almanac" is priced at \$250 with additional copies available for \$75 from the Gartner Group, 72 Cummings Point Road, Stamford, Conn. 06902.

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Reports Examine Equipment Maintenance

MOUNTAIN VIEW, Calif. — The market for third-party maintenance of computer and data communications equipment will expand six-fold over the next 10 years to about \$3 billion. At the same time, the growth of

low-cost computing and communications equipment is changing the economics of equipment maintenance.

These were the findings of two reports recently released by International Resource Development, Inc. (IRD), located in Norwalk, Conn., and Input, Inc., headquartered in Mountain View, Calif.

The 145-page IRD report, *U.S. Third-Party Maintenance Market for Computers and Datacom Equipment*, maintained that because computers and terminals have become smaller and lighter, a trend has begun toward establishing service centers to which users carry or mail their equipment for repair. More than 80% of the market, however, is still devoted to on-site field-service activities.

While third-party maintenance of computers and peripherals is handled by a wide variety of companies, two-thirds of the market is shared by seven nationwide service vendors, most of which are divisions of large multinational corporations, the IRD study said.

In light of these facts, IRD advised improved marketing techniques to ensure continued market acceptance, as well as intelligent management of growth for professionalism and profitability.

Low-Cost Equipment

In the other report, Input reasoned that while most users want on-site maintenance, the low site-value of many installations makes this impos-

sible. In addition, qualified field-service personnel are growing more scarce as low-cost devices are proliferating, according to *Maintaining Low-Cost Equipment Profitably* — a study developed for the European market, but applicable anywhere, according to an Input spokesman.

The 126-page study made specific recommendations on how management can anticipate and respond to rapid changes in technologies and markets.

IRD's report costs \$985 from the firm at 30 High St., Norwalk, Conn. 06851.

Input's report, priced at \$2,000, can be obtained from the firm at 1943 Landings Drive, Mountain View, Calif. 94043.

Supershorts

Control Data Corp. (CDC) has completed construction of an electromagnetic compatibility test facility in Minnesota that will be used to evaluate the electromagnetic profile of computer equipment. The testing is required in order to meet new U.S. Federal Communications Commission regulations on electronic interference from computers. New CDC computers and those in production will be measured. The laboratory will be available to outside firms for testing purposes.

The Computer Systems Division of Harris Corp. has given a Harris 800 supermini, valued at \$300,000, to the University of Florida for its newly established Interactive Graphics Laboratory and computer-aided design and manufacturing center at the university's College of Engineering.

NBI, Inc. will acquire TRW, Inc.'s international NBI product distribution rights and its operations for NBI products in Canada, West Germany and the U.S. for \$8.25 million. The initial payment is approximately \$2.7 million, with the balance payable over three years. NBI has also finalized an agreement to acquire certain assets formerly owned by Computer and Systems Engineering, the NBI distributor for the UK.

Twix AG, the Swiss manufacturer of information processing equipment including the Twixtype, has opened its U.S. marketing and distribution headquarters in Dallas. The Twixtype is a word processing system designed to enhance or upgrade existing electronic typewriters.

Orders & Installations

Control Data Corp. has received an order from Texaco USA for a Cyber 205 supercomputer system valued at approximately \$19 million.

Paychex, Inc., a nationwide payroll processing service, has ordered 35 computer systems valued at \$2.5 million from Prime Computer, Inc. for installation in Paychex's offices throughout the U.S.

Sperry Univac has been awarded a contract by the U.S. Department of Commerce for a Univac 1100/84 system to be used by the Bureau of the Census. The award is valued at \$35 million over the life of the contract.

Benson Software Systems has installed a Timespan leased asset tracking system at Unicom Computer Corp. of Sausalito, Calif.

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The ECS 4500 terminal can stand alone as a data processor, or interact smoothly within a distributed systems environment. It's compatible with major mainframe protocols — Burroughs, Honeywell, IBM, NCR, DEC. Using two double-density floppies, it can deliver a hefty 2-MB memory, allowing you to enter and retrieve data — or transfer whole files — to or from different host computers while handling the bulk of your processing needs.

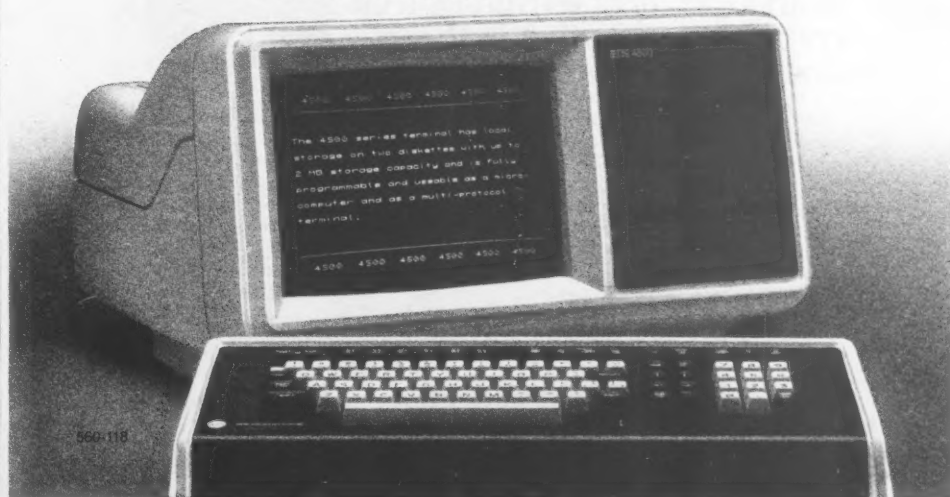
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ECS 4500 Network Terminal



Nickels & Dimes

Envision Technology, Inc. has completed bank and venture capital financing agreements of \$6.5 million. Venture capital investments totaling \$3.7 million were made by Sutter Hill Ventures; Kleiner, Perkins, Caufield & Byers, Merrill, Pickard, Anderson & Eyre; Merrill Lynch Venture Capital; and Greylock Management Corp. Bank of the West provided \$2.8 million.

\$\$\$

Context Management Systems has completed the sale of stock valued at \$1 million to Brentwood Associates, a Los Angeles venture capital firm.

\$\$\$

The Foxboro Co. has purchased stock in Microprocessor Systems, Inc., a manufacturer of small comput-

ers with headquarters in Maitland, Fla. The amount of stock involved in the transaction was not specified but the Foxboro commitment is "substantial," according to Foxboro Chairman Earle W. Pitt.

\$\$\$

American Management Systems, Inc. (AMS) has established a reserve of approximately \$3 million to provide for the potential write-off of a contract claim subject to litigation. AMS is seeking approximately \$5 million in payments from Arthur D. Little, Inc. and Delphi Associates, Inc., for work performed by AMS while working as a subcontractor for Delphi. The defendants have filed counterclaims totaling nearly \$7 million.

Mergers & Acquisitions

GTE Corp. and Southern Pacific Co. (SP) have reached an agreement whereby GTE will acquire all the stock of SP's communications and satellite subsidiaries for approximately \$750 million. SP will retain any damages arising from its antitrust case against AT&T pending in U.S. District Court.

Anacomp, Inc. has acquired the business of Computer Management Systems, Inc. of Indianapolis and affiliated companies for an undisclosed amount of Anacomp stock.

Telex Corp. has purchased substantially all the assets of the education systems' operation of the Singer Co.'s Education Division for cash.

The purchase price was not disclosed.

Stockholders of Fulcrum Computer Corp. have voted in favor of a merger with Adage, Inc. The merger will be completed by an exchange of stock, with Fulcrum's approximately 14 million shares having a value of approximately 34 cents each.

Tymshare, Inc. has sold its bank credit card processing business for cash to First Data Resources, Inc., a subsidiary of American Express Co. The purchase price was not disclosed.

Computone Systems, Inc. has completed its acquisition of Infotecs, Inc., with Infotecs becoming a wholly owned subsidiary of Computone.

United Telecommunications, Inc. has signed a merger agreement to acquire Aero-Flow Dynamics, Inc. Approximately 45% of the Aero-Flow shares outstanding on the effective date of the merger will be converted into \$60/share in cash, and the remaining 55% will be converted into shares of United Telecom's common stock on the basis of 3.069 shares of United Telecom stock for each Aero-Flow stock.

The Datacorp Division of Kalvar Corp. has acquired two Salt Lake City, Utah, firms, Perpetual Storage, Inc. and Management Services Corp. The firms will be merged into a micrographics service bureau in Salt Lake City.

New Companies

Automated Business Management, Inc. specializes in custom software development for the IBM System/34 and System/38. It also provides computer feasibility studies, systems consulting, facility management and data processing services. The company is located at 837 W. Foothill Blvd., Monrovia, Calif. 91016.

Sci-Com Computer Systems is a joint venture company formed by Seiko-K. Hattori & Co., Ltd. of Japan and Science Management Corp. of New Jersey for the development, exclusive marketing and distribution of a small business computer system. Intech Systems Corp. of Reston, Va., has been named the company's exclusive master distributor. Sci-Com can be reached through P.O. Box 981, Rt. 22, 6050, Bridgewater, N.J. 08807.

ISS Data, Inc. is a wholly owned subsidiary of ISS International Service System, Inc., formed to provide data processing services to the corporate offices and to the four operating divisions of the parent company.

IGC, Inc. is a company co-founded by the former president of Vesco Instruments, Inc. that will design, manufacture and market graphics display controllers and graphics display systems. The new firm is located in Commack, N.Y.

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We currently have an opening for an individual with 6 years of teleprocessing/systems programming experience and with extensive knowledge of on-line computer concepts, BAL, COBOL, OS-JCL, TSO and general software utilities. Heavy experience in CICS and/or TCAM, VTAM, & JES II under MVS preferred.

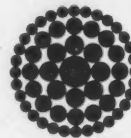
The Job:

The individual hired as Senior Teleprocessing Programmer Analyst will be responsible for installing, modifying, testing, and maintaining TP information processing systems, TP access methods, TP "front end" software, and TP utility support systems. In addition, he/she will act as a technical advisor to the Applications Programming Staff.

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Other positions are currently available for a senior analyst with laboratory computer experience, a senior management engineer, and a data base manager. Call for more information. Please, no agency referrals. Equal Opportunity Employer.

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Several systems programmers are needed with varying levels of experience ranging from a two-year programmer to an eight-year working supervisor. Experience in some or all of the following areas/skills is required: MVS/SE or SP1 internals, JES2, NJE, VSAM, IMS, TSO command language, SAS graphics, and support of IBM and non-IBM products. All positions have high visibility and user contact.

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As a DBA you will be responsible for design and/or technical support in an IMS

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Your experience should include 5-10 years in data processing with 3-7 of those years performing the above responsibilities.

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Your responsibilities will include all facets of technical support with emphasis on end user interface, standards development and training. Experience in a query language, such as FOCUS, RAMIS II, INQUIRY IMS, is desired.

A background of at least 3 years of MARK IV and 7 years in data processing is required.

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Your primary responsibilities will include maintenance, enhancements and new development to support functions involving various financial and employee-related systems. These programs include payroll support using the McCormack and Dodge package (formerly GCS).

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This position requires experience of at least 3 years in design, analysis and programming of commercial application systems, and at least 2 years in IMS on-line DB/DC and PL1. A background in ADF or MARK IV is also essential.

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In this quality assurance function you will follow a structured Aramco methodology in reviewing project deliverables to insure they are accurate, consistent and meet all requirements. You will also recommend changes and continuation/cancellation of projects. In addition, analysts will help the organization develop and publish standards, procedures and guidelines. A background in IBM TSO/SPF and PL1 is required as well as good verbal and written communication skills. Experience with ADF, IMS, SAS or SCRIPT/VS is a plus.

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Systems analysts are needed with 2-7 years' experience. Project management experience is preferable. Knowledge of higher programming languages, in particular MCAUTO's Management Control Software (MSCS, COPES, TMAPS, MAPS, and LISS), is needed. Analysts will work with engineering clients defining project requirements, designing and implementing systems. Analysts will also work with project management teams to define reporting requirements.

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- AOS/COBOL and/or Assembler on Data General equipment. College degree preferred.
- RPGII and COBOL on IBM 4300 series with DOS/VSE and CICS. Distributed Systems experience and college degree preferred.

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We offer exceptional fringe benefits; a congenial, supportive environment; definite promotional opportunity; and a distinctive lifestyle in our beautiful Baltimore location with unmatched cultural, educational, sports and recreational advantages. Send your detailed resume, in confidence, TODAY to: Mr. J.T. Fisher, Professional Recruiter, The Johns Hopkins Medical Institutions, Office of Employee Relations, 624 N. Broadway, Baltimore, MD 21205. An Equal Opportunity Employer.

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40 hours per week at \$17,160 per year salary. Analyze, design and develop sophisticated data base related software for a CODASYL compliant database management using the C Computer System programming language. Develops an interactive computer networking system to couple computers together and allow interactive access to databases on other computers.

Requires Masters degree in Computer Science. Must have complete knowledge of Database systems and C Computer System Language, ability to program database management software for various computer systems.

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Reference #6582

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The Computer Science Department of the University of Tennessee at Chattanooga seeks applicants for a position of assistant or associate professor. The position will be available in January 1983. Duties include undergraduate and graduate teaching, curriculum development, student advising and direction of graduate research projects and Theses. A PhD in Computer Science or a closely related area is desired but an MS in Computer Science and equivalent experience will be considered.

Candidates from all areas of computer science will be considered but experience in computer graphics, architecture and compiler design is of special interest. Send applications to:

Dr. Jack Thompson
Head, Computer Science
University of Tennessee at Chattanooga
Chattanooga, TN 37402
or call (615) 755-4329.

The University of Tennessee is an Equal Opportunity/Affirmative Action Employer.

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Job dissatisfaction, complacency, and frustration are the biggest obstacles to overcome to achieve one's career goals. Every day new career opportunities pass us by because we are unaware of their existence. Let us keep you abreast of what your true value is in the market place. Absolutely no obligations, please call or write Keith Reichle, CPC, Data Processing Specialist.

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The successful candidate will have 4-6 years experience planning, evaluating, and managing a high production computer environment. The position demands good interpersonal skills, user interface, a working knowledge of data communications, word processing systems, data entry systems, and a thorough understanding of current computer technology.

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POSITION ANNOUNCEMENT
DIRECTOR OF CENTRAL DATA
AND INFORMATION SERVICES
WEST VIRGINIA UNIVERSITY

Nominations and applications are invited for the newly created position of Director of Central Data and Information Services at West Virginia University.

West Virginia University is the State's land-grant comprehensive doctoral degree granting University with 23,000 students and 1,349 total faculty. The graduate faculty number 943 with 5,600 students in graduate programs. West Virginia University is located approximately 70 miles south of Pittsburgh, Pennsylvania and 200 miles west of Washington, D.C. The Director, who will report to the President's Cabinet, will have general responsibility for continuing development of automatic data processing, for the development of a strategic institutional analysis capacity, and for developing a comprehensive management information system. Qualifications for the position include formal training at or beyond the Masters Degree level in the areas of computing and information systems, and significant relevant management responsibility.

Nominations, applications and supporting documentation will be accepted until December 12, 1982. The position will be filled as soon as possible after the application deadline. Applications, including an up-to-date vita and three references should be sent to:

**Professor Harold I. Goodwin, Chair
Director of Central Data and Information
Services Search Committee
105 Stewart Hall
West Virginia University
Morgantown, West Virginia 26506
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DATA PROCESSING - At least three years business applications programming experience. Proficiency in COBOL, and at least two of the following: RPG, BASIC, FORTRAN, ASSEMBLER.

COMPUTER MAINTENANCE - At least three years experience in Computer Maintenance, including peripheral devices, computer interface and digital electronics.

Prefer Bachelor's Degree and teaching experience. Both positions are additions to growing programs. Texas State Technical Institute-Hartlingen which is located in the sub-tropical Rio Grande Valley of Texas, close to beautiful beaches and Mexico, has experienced 20% enrollment increase this Fall. Come grow with us!

CONTACT

**Thad Kenney, Personnel Director
Texas State Technical Institute
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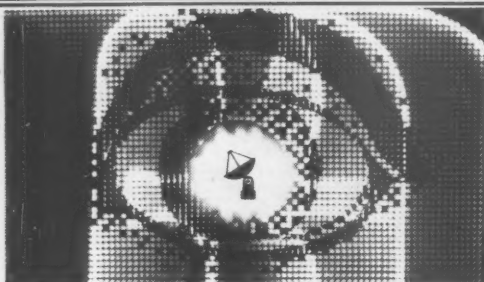
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The National Bank of Kuwait S.A.K.

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Computers

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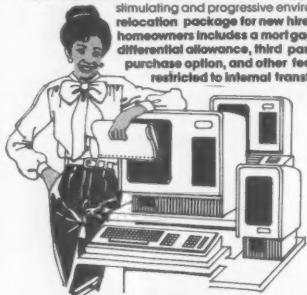
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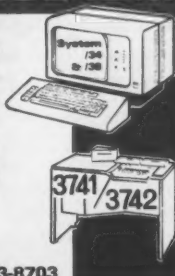
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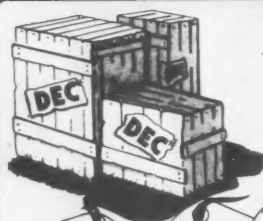
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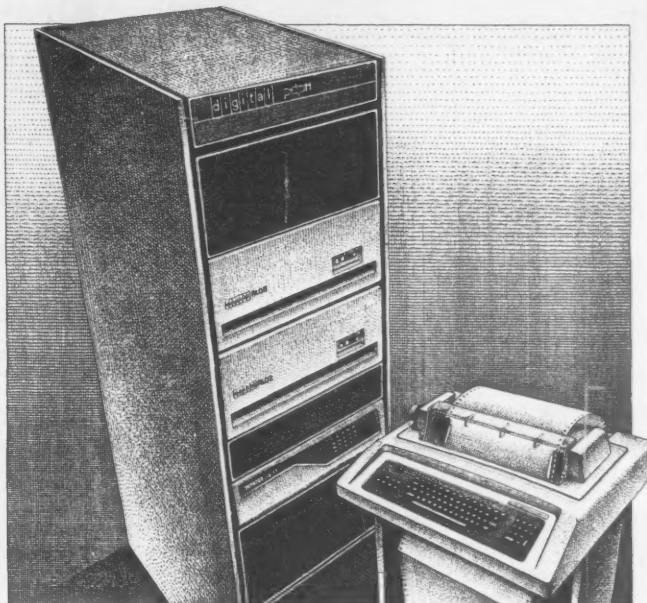
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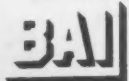
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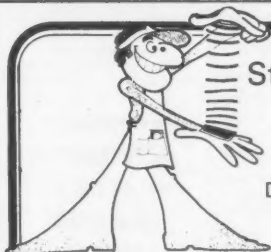
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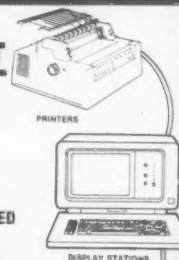
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Opening date: November 16, 1982

Time: 2 p.m.

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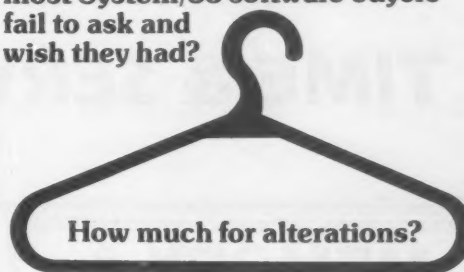
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Altos Computer Systems	70-71
American Telephone & Telegraph	28-29
Ampex-Memory Products Division	96
Anderson Jacobson	15
Applied Computer Research	40
Applied Data Research	3
Applied Digital Data	69
Applied Software Technology	36
Arkay Computers	ID/8
Babb Computer Associates, Inc.	ID/4
Glenn A. Barber & Associates	62
Battelle	SR/18
John Beall Co.	85
Beehive International	SR/13
BMC Software	SR/29
Boole & Babbage	86
M. Bryce & Associates	SR/10
Bytek Corporation	38
Carlton Corp.	SR/34
C.C.S. Int.	SR/50
Center for Advanced Prof. Educ.	94
Chubb Institute	31
Cincom	ID/16
CIS	68
CMI	54
Codem	32-33
ComDesign	39
Communications Electronics	73
Computer Consoles	92-93
Computer Corp. of America	SR/21
Computer Devices	SR/43
Computerics	52
Computer Transceiver	SR/8
Computerworld Spain	SR/53
Computerworld Supplement	16
Control Data	67
Cullinane Database	19,58,SR/36-SR/37
Data Base Design	SR/28
Data Base Management, Inc.	SR/45,SR/48
Data General	SR/54-SR/55
Datapro	SR/33
Data Processing Design	ID/11
Datex	31
DEVA Systems Software	SR/42
Digilog	ID/14
Digital Consultants	SR/40
Digital Equipment Corp./Networking	50-51
Digital Equipment Corp./Trad. Prod. Line	14
Direct, Inc.	82
EDP	SR/22
EEC Systems	SR/22,50
EMC	34
Execucum	SR/57
Fusion Products	57
Gandalf	30
General Dynamics Data Systems	84
General Electric	ID/8,97
G.E.Space Systems Division	SR/32
General Research Corporation	62
Goal Systems	SR/5
Graham Magnetics	55
Habush, Habush & Davis	18
Honeywell Info. Systems	SR/24-SR/25
Human Computing Resources	SR/50
H & W Computer Systems, Inc.	40
IBM	12-13,SR/27,87
ICOT	ID/6
IMS	SR/9
Infodata Systems	SR/59
Informatics Software	SR/46-SR/47
Information Builders	SR/16
InfoSci	ID/4-ID/5
Innovation Data Processing	9
Integrated Systems	26
Intel Corp.	SR/23
Interactive Systems	SR/44
IPL Systems	48
ISI International	62
Isoreg	39
ISSCO	ID/10
J.W. Lampl	27
Lanier Business Products	10-11
Lear Siegler	ID/13
Leasametric	SR/26
Leasametric/Televideo	83
Lee Data Corp.	94
Letronic, Ltd.	ID/2
Levi, Ray & Shoup	SR/10
Lifetime Learning Publications	89
Local Data	89
Magnuson Computer Systems	63
M.B. & Associates	20
MCBA	SR/19
John McLean Associates	56-57
Memorex-Communications Group	49,74
Memorex-Media Products Group	72
Merlyn Corporation	SR/40
Microdata	24-25,SR/12
MicroRim	SR/45
Mitel	90
Mitron Systems	39
Modemplus	95
MSX	128
M.V. Associates	35
National Advanced Systems	ID/9
National Computer Corp.	ID/14
National Information Systems	SR/22
NEC	76-77
NEC/Info. Systems	38
Neware Consulting	52
On-Line Software	SR/20,90
Otrona Corporation	64
Pace Applied Technology	ID/12
Panoscopic	41,96
Performance Development Corp.	SR/10
Perkin-Elmer	SR/17
Personnel Data Systems	91
Prime	6
Questronics	31
Racal Vadic	35
Radio Shack	88
RCA	ID/77
Right Distributors	39
Rinco	17
SAS Institute, Inc.	SR/31
Signal Technology	39
Software AG	SR/22
Software Corp. of America	22
Software House	SR/52
Software International	81
Solutions	86
Southwestern Publishing	6
Spiratus Computer	ID/10
Synapse Computer	SR/11
Synsort	7
T. B. Computing	40
Teletype	23
Televideo/Leasametric	83
Televideo Systems	36-37
Term-Intronix, Inc.	56
Texprint	56
Thomas Engineering	8
Tone Software	8
Tymnet	20-21
U*3'S	SR/27
Universal Data Systems	18
Universal Software	53
Visual Technology	78
Wang Laboratories	63
Whitesmith, Ltd.	SR/10
Wolfe Computer	ID/11
Xerox/OPD	SR/14-SR/15
Yorodon	5,SR/56
Zilog-Systems Division	27

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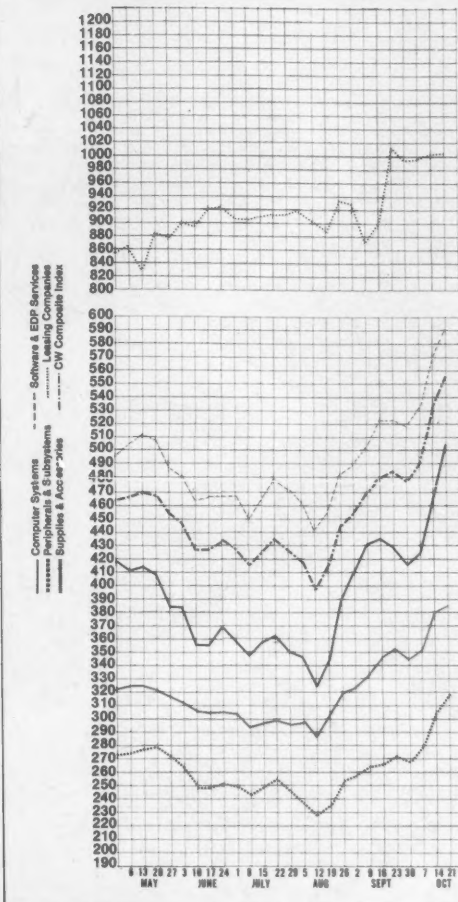
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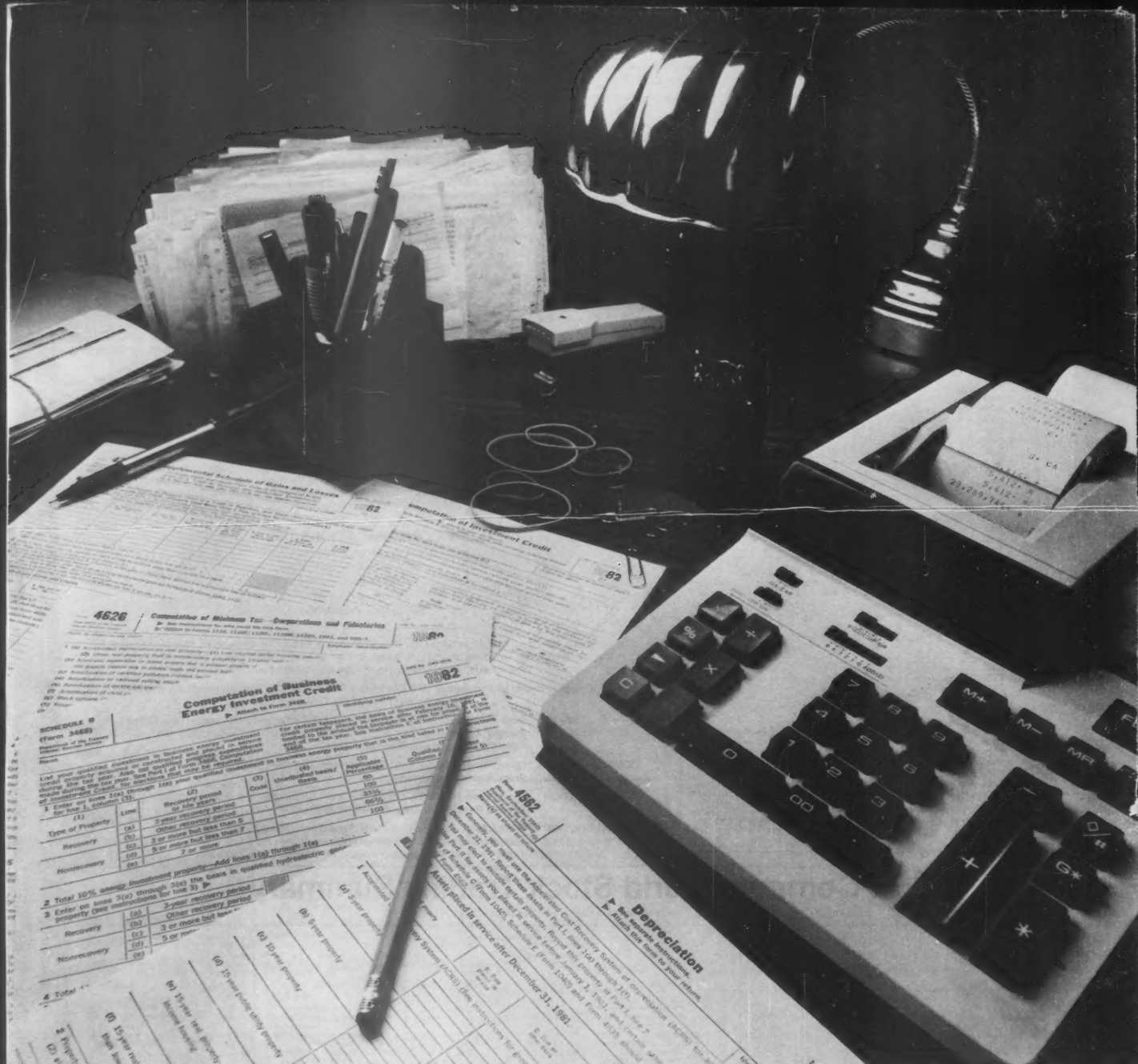
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	1981-82 RANGE (1)	CLOS OCT 20 1982	WEEK CHNGE	WEEK PCT CHNGE	WEEK CHNGE	WEEK PCT CHNGE		1981-82 RANGE (1)	CLOS OCT 20 1982	WEEK CHNGE	WEEK PCT CHNGE	WEEK CHNGE	WEEK PCT CHNGE		1981-82 RANGE (1)	CLOS OCT 20 1982	WEEK CHNGE	WEEK PCT CHNGE	WEEK CHNGE	WEEK PCT CHNGE	
COMPUTER SYSTEMS																					
A ANDRAH CORP	18-48	28 5/8	+1	1/8	+4.0	O ADVANCED COMP TECH	1-15	2 1/8	-1/8	-5.5	A COMPUTER CONSOLES	16-28	26 5/8	+1	5/8	+6.5					
N BURROUGHS CORP	28-72	43 1/8	+3	3/8	+8.4	O ADVANCED SYSTEMS INC	8-18	11 1/2	+1/4	+2.2	O COMPUTER DEVICES INC	4-19	18 1/2	+3	1/2	+23.3					
O COMPUTER AUTOMATION	8-28	14 3/4	+3	1/2	+31.1	O ASS COMPUTER INC	11-11	10 1/2	+1/2	+5.0	O COMPUTER TRANSCIVER	1-18	18 1/2	-1	1/4	+6.5					
N CONTROL DATA CORP	19-42	38 1/2	+2	1/2	+7.3	O ANACORP INC	10-19	13	+3/8	+5.0	N COMPUVISION CORP	20-49	29 1/4	+4	7/8	+0.0					
N CRAY RESEARCH INC	20-49	38 1/2	+7	+23.7	O ANALYSTS INTL CORP	3-14	7 1/2	+1/2	+7.1	N CNRAC CORP	17-35	35	+4	7/8	+16.1						
N DATA GENERAL CORP	21-67	36 7/8	+6	3/4	+22.4	O APPLIED DATA CORP	10-23	30 1/2	+3	+2.4	O DELTA DATA SYSTEMS	1-14	14	-1	1/4	-8.1					
N DATAPOINT CORP	11-68	37 1/4	+1	5/8	+10.0	O ASK COMPUTER SYSTEMS	11-22	22 1/8	+1/2	+12.7	A DATAPRODUCTS CORP	16-44	23 1/4	+2	+1	+7.3					
N DIGITAL EQUIPMENT	62-113	98 3/4	+4	+2/4	+2.8	B ASTRADYNE CORP INC	1-5	5 1/2	+1/4	+20.0	O DATARAM CORP	8-15	7 3/4	+7/8	+12.7						
A EECO INC	8-19	8 7/8	+1/8	+4	+8.5	N AUTOMATIC DATA PROC	1-1	1	+1/4	+5.4	O DATA DATA SYSTEMS	1-14	14	+3/4	+1/8	+0.0					
N ELECTRONIC ASSOC.	10-13	10 5/8	+7/8	+8	+8.0	O CBA COMPUTER ASSOC	4-25	5	-3/8	-6.9	O DAVID JARISON CARPLY	2-7	2 7/8	-3/8	-11.5						
N FLOATING POINT SYST	13-30	24 1/2	-1	-1/8	-0.5	O COMPUTER ASSOC INT'L	12-35	32 3/4	-1/4	-5.0	O DECISION DATA CORP	3-7	6 7/8	0	0.0						
N FOXBORO	22-82	34 5/8	+3/4	+8	+8.0	O COMPUTER HORIZON	1-1	1	+1/4	+5.4	O DELTA DATA SYSTEMS	1-14	14	+3/4	+1/8	+0.0					
N GENERAL AUTOMATION	3-16	5 3/4	+2	3/8	+70.3	O COMPUTER NETWORK	4-8	8 1/8	+1	+14.0	N ELECTRONIC M A	3-9	5 3/8	+3/8	+7.5						
N HARRIS CORP	21-60	37	-3/4	-1.9	-1.9	N COMPUTER SCIENCES	11-30	17 1/8	+3/4	+4.5	O EVANS & SUTHERLAND	18-40	35	+3	1/4	+10.2					
N HELETT-PACKARD CO	39-68	65 5/8	+5	+5	+5.0	O COMPUTER TABS CORP	1-1	1	+1/4	+5.4	O GEN'L DATA COMM INC	7-19	14 1/2	+3/8	+2.8						
N HONEYWELL INC	60-113	92	-1	-1/4	-1.3	O COMPUTER USAGE	2-10	2 3/8	0	0.0	O GENERAL TERMINAL CP	0-4	1/8	0	0.0						
N IBM	48-85	84 1/2	+1	+1.1	+1.1	O COMBIVISION CORP	1-18	18	-3/8	-2.2	O GREAT SOUTHWEST IND	3-22	3 1/2	+1/2	+16.6						
N IPL SYSTEMS INC	5-13	6 3/4	+1	+1/2	+8.3	O COMSHARE	8-21	6 7/8	-1/8	-1.7	N HAZELTINE CORP	19-36	36 3/8	+4	1/4	+13.2					
O MAGNUSON CORP SYSTS	2-32	2 3/8	+3/8	+18.7	N CULLINANE DATABASE	15-45	44 3/8	-1/4	-0.5												
N MANAGEMENT ASSIST	7-26	10 7/8	+1	+1/2	+4.8	O CYCARE SYSTEMS INC	9-14	12	+1	+11.2	O ICOT CORP	3-4	3	-1/4	-7.5						
O MINI-COMPUTER SYST	1-4	1 1/4	-1/8	-34.3	O DATA DIMENSIONS INC	1-3	3 1/4	0	0.0	O INFORMATION INTL INC	8-17	16 1/4	-1/4	-1.5							
N MODULAR COMPUTER SYS	10-32	31 3/8	+1	+9.6	O DATATAB	4-10	3 1/4	0	0.0	O INTEL CORP	21-31	38	+1/4	+0.6							
N NIDRUM DATA SCI	30-32	32	-1	-1/4	-1.4	O DYATRON CORP	2-11	2 1/4	-1/4	-10.0	A IPL SYSTEMS INC	5-19	6 3/4	-1/2	-8.8						
N NCR	38-82	81 1/2	+12	7/8	+18.7	N ELECTRONIC DATA SYST	15-42	41 3/4	+1/4	+4.3	A LUNDY ELECTRONICS	7-18	9 1/8	0	0.0						
N PERKIN-ELMER	17-36	26 2/8	+7	+1/2	+5.8	O INFORMATIONIC INC	10-23	16 1/4	+3/8	+8.2	A MSI DATA CORP	11-27	25 1/4	+6	+31.1						
N PRIME COMPUTER INC	32-65	53 1/4	+3	3/8	+11.2	O INSYTE CORP	1-3	1 5/8	0	0.0	O NETWORK SYSTEMS CORP	14-28	28 5/8	-1/2	-1.7						
N SPERRY CORP	21-65	27 3/4	+1	+1/2	+1.7	O IPS COMPUTER MARKET	1-2	1 1/8	0	0.0	O ONES	3	3	0	0.0						
O TANDLER COMPUTERS INC	13-35	27 1/8	-1	-3.5	O DEANE & ASSOCIATES	6-12	6	0	0.0	N PARADYNE CORP	24-32	43 3/8	+3/8	+0.8							
N TEXAS INSTRUMENTS	71-151	114 5/4	+5	+5/8	+1.1	A LEOCON	12-38	24 3/8	+1	+1.8	A PENNIT CORP	7-17	8 5/8	-1/4	-2.8						
A WANG LABS "B"	24-48	48	+4	+9.0	O MNOI SCI AHER INC	17-38	31 1/4	-2	-7.4	O ORNATE CORP	1-1	1	0	0.0							
A WANG LABS "C"	21-45	48 7/8	+4	3/4	+10.7	O MATHEMATICAL APP GRP	12-28	18	+1	+10.3	N RECONITION EQUIP	4-21	7 7/8	+7/8	+12.5						
LEASING COMPANIES																					
O BOOTH FIANANCIAL CP	18-28	24	0	0.0	O NATIONAL DATA CORP	13-28	19 1/8	+1	+5.4	O SCAN DATA	1-5	1 1/4	0	0.0							
N COMDISCO INC	15-27	25 3/8	+3	+1.5	O PANOSOPHIC SYSTEMS	8-16	15 3/4	+1/2	+4.8	O SCIENCE TECHNOLOGY	18-24	24	-2/8	-1.8							
B COMMERCE GROUP CORP	1-1	1 3/8	0	0.0	N PLANNING RESEARCH	5-13	9 1/4	+5/8	+7.8	O SKYES DATATRONICS	6-34	7 1/4	-1/8	-18.3							
O COMPUTER INVSUTS GRP	1-2	1 1/4	0	0.0	O PROGRAMMING & SYS	1-2	2	+1/4	+14.2	A T BAR INC	7-18	9 1/4	+1/8	+1.3							
O CONTINENTAL INFO SYS	4-14	13 1/2	+1	+3.8	O REYNOLDS & REYNOLD	18-26	23 3/4	+1/4	+1.0	A SEC INC	1-1	1	0	0.0							
O ITEL INC	1-5	5 3/8	0	0.0	O SHARED MEDICAL SYST	28-45	44 3/8	-1/8	-0.2	N TEKTRONIX INC	38-70	47 1/2	+1	+12	+3.2						
O LEASAP CORP	1-2	1 1/8	0	0.0	O SCIENTIFIC COMPUTERS	8-16	9	-3/4	-7.8	N TELEX	3-14	14 1/4	+2	+3/8	+20.4						
N U.S. LEASING	18-32	31 1/4	-3/4	-2.3	O SOFTWARE AG	5-23	9 7/8	+1	+12.7	O TESDATA SYSTEMS CP	3-17	5 3/4	+1/8	+31.0							
					N TYSHARE INC	13-58	22 1/4	-3/4	-3.2												
					N URS CORP	10-18	10 3/4	+1/2	+8.8	A TIMEPLEX INC	7-19	15	+3	+1/2	+30.4						
					N WYLY CORP	7-20	10 5/8	+3/4	+7.5	O VLSUAL TECHNOLOGY	8-15	12 3/4	+1/2	+4.0							
										O WILTR INC	1-3	1	0	0.0							
PERIPHERALS & SUBSYSTEMS																					
N AM INTERNATIONAL	1-15	1 1/8	0	0.0	N AMERICAN BUS PRODS	11-19	16 5/8	-1	-1/8	-8.3											
A ANDERSON JACOBSON	8-28	18 3/4	+2	7/8	+20.7	O BALTIMORE BUS FORMS	1-2	1	0	0.0											
O AUTO-TOOL TECHNOLOGY	8-62	64	-1	-1/2	-3.4	O CYBERNETICS INC	1-1	1	0	0.0											
N BANCORP INC	7-35	1 1/2	-1	-3.4	-3.4	O DUPLEX PRODUCTS INC	1-18	18	-1	-1.8											
A BEEMIE INT'L	4-18	17 1/8	+1	7/8	+31.2	N ENNIS BUS. FORMS	15-28	27 1/2	+1	+7/8	+7.3										
A BOLT-BERANEK & NEW	9-28	28 1/4	+3	+2.8	+2.8	N FINCOMP	48-78	75 3/4	+1	+1.8											
O CAMAC CORP	2-9	9	-1	-1.0	-1.0	A GAMP LTD	28-35	34	-3/8	-3.8											
N CENETRONICS DATA	4-12	12 1/2	-1	-0.4	-0.4	N NASHUA CORP	8-33	30 5/8	-1	-2.2											
A CETEC CORP	4-9	9 3/8	+3/4	+16.2	+16.2	O STANDARD REGISTER	30-80	59 1/4	+3	+3.8											
O CONTECHNICS	2-11	6 3/8	+1	+6.0	+6.0	A TAD PRODUCTS CO	5-12	11 1/2	+1/2	+4.0											
O COMPUTER COMMUN.	1-1	1	0	0.0	0.0	N WALLACE BUS FORMS	22-43	42 3/4	+3/4	+8.5											

EXCH: N=NEW YORK; A=AMERICAN; P=PALM-BALT-HAMB; B=BOSTON

W=WASHINGTON; R=RIMMIDEST; D=DOWER-THE-COUNTER

D-T-C PRICES ARE BID PRICES OF 3 P.M. OR LAST BID

(1) TO NEAREST DOLLAR



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